AMERICAN
JOURNAL OF SURGERY

VOL. XXV. NOVEMBER, 1911. No. 11.

OUR PRESENT KNOWLEDGE IN REGARD TO INFANTILE PARALYSIS.*

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In the Talmud, which dates back to the fourth century, are references to the application of apparatus for those deprived of the use of the lower extremities, which goes to show that in ancient Jewish surgery something was known in regard to the treatment of paralytic conditions.

In the literature of India, in the "Susruta," estimated as having been written from 1000 B. C. to 700 A. D., appliances for paralyzed children are referred to.

Infantile paralysis is evidently not a new disease, but Wickman drew the attention of the medical profession to its *epidemic* nature in his valuable monograph on the Norwegian and Swedish outbreaks in 1905 and 1907.

No mention is made in the best text-books ten years ago of this epidemic character of the disease.

Until the New York epidemic of 2,500 cases in 1907 was reported, epidemics of infantile paralysis were a rarity in this country. Since then there have been published accounts of epidemics occurring in Pennsylvania, Michigan, Minnesota, Virginia, Massachusetts and Nebraska.

These reports are from comparatively few physicians, for, very unfortunately, as a rule, State health departments do not require these cases to be reported. At the present time only twenty-three States require reports of this disease.

To neurologists and orthopedic surgeons it is appalling as well as distressing to note the great increase in the numbers of these cases. The mortality is small, but the percentage of resulting paralysis is close to 90, as few cases recover absolutely. In my own experience some 200 to 300 cases are treated annually at the Kernan Hospital for Crippled Children, not counting those seen at the other hospitals by me.

Attention has been significantly called in this country to the greater number of cases seen in those localities where immigration has occurred from Scandinavia, which may have some bearing on the etiology.

Calmer first reported cases in this country in 1843, one of infantile hemiplegia and ten other varieties of anterior poliomyelitis seen by him at West Feliciania, La.

Anderson's report of the 1909 Nebraska epidemic of 279 cases in Polk County (there were 999 in the whole State) is most interesting and instructive. In his analysis 84 per cent. were under ten years of age, fewer cases occurred up to the twenty-second year, and one patient was thirty-six. Dr. H. Winnett Orr, of Lincoln, Neb., personally collected 617 cases and lays great stress on the importance of quarantine. (*Am. Jour. Orthop. Surg.*, February, 1911.)

CONTAGIOUSNESS.

In some large families only one child would be infected, and in others all but one or two. This seems dependent more on the qualitative virulence of the virus than on hygienic surroundings or feeble family resistance. We also see that the disease is more contagious at some times than at others.

Anderson's cases had previously—as a rule—been unusually healthy children, as is most often the case in my experience, and lived in an invigorating, sanitary country environment, the strongest child in the family being the one often most seriously afflicted.

Anderson believes that the disease was undoubtedly carried directly from case to case, but in certain instances by a third person. He cites as an example: Two families, A and B, lived some distance apart in the country. A girl from family B visited a family C, in which a boy was ill with infantile paralysis. On her return home she found children of family A visiting her home, who left shortly after her return. In five days her sister had the disease; a few days later a child in family A had it, and at intervals of a few days three other chil-

*Read before the Washington County Medical Society at Hagerstown, Md., Nov. 10, 1910.

dren in her own family had it—five cases carried by one person. He cites other similar instances. The carrying of contagion by intermediate people has also been reported on several occasions in the Scandinavian epidemics.

Flexner, however, has not been able to demonstrate the spontaneous transfer of this disease from infected to healthy monkeys by contact, although they are very susceptible to it by direct inoculation and it is highly fatal to them. He, however, distinctly states that this fact does not militate against the notion of contagion in respect to the spontaneous disease in man, as monkeys are not naturally susceptible to this disease unless artificially implanted.

THE VIRUS.

Flexner and Lewis, almost simultaneously with Laudsteiner and Levaditi, have given us the valuable addition to our knowledge of this disease in their discovery that the infectious agent is an extremely minute microorganism. It is ultramicroscopic and on passing through the pores of the finest, densest porcelain Chamberlain filters retains its potency. This has been brought out by experimental research on monkeys; and attempts to implant the disease on other animals, including guinea-pigs, rabbits, rats, mice, dogs, cats, sheep, cows, goats, pigs, chickens, pigeons and the horse, have failed. Flexner thinks, however, that the paralysis seen in poultry, the dog and horse are due to a cause peculiar to the species infected. This is especially interesting, as in the epidemic in Michigan, in 1907, Griffin reported that many pigs and chickens were also affected. Krause, also, in the Westphalia epidemic of 1908, reported a coincident great mortality among chickens.

In consultation with Dr. John I. Pennington recently I saw a child, in the acute stage, who had played five days before in a chicken yard where many of the fowls showed paralytic symptoms. The child did not have any chicken nor eggs to eat at the house she was visiting.

A colleague told me of hearing of two children who had eaten chicken and their dog had eaten the bones, and all three were paralyzed shortly after.

MODES OF INFECTION.

Flexner is inclined to believe that the virus gains access to the cerebro-spinal axis by means of the nasal mucous membranes and lymphatics through the cribriform plate of the ethmoid. He also thinks it is eliminated by it. Intraperitoneal injection of monkeys with spinal cord material from a child who died of paralysis reproduced the disease, but the cord from such infected monkeys would not reproduce the disease when introduced intraperitoneally in other monkeys.

The disease could also be reproduced by infection into the circulation, the subcutis, spinal canal, large nerves and certain mucous surfaces, from human to monkey. Similarly, if peristalsis is minimized by opium the introduction of comparatively large quantities of the virus into the stomach and intestines will reproduce the disease.

On examination of at least 90 per cent. of our histories I am quite within the limit in saying that gastro-enteric symptoms so preponderated at the onset that it seems suggestive that the systemic infection started there, and in the human subject there are rarely symptoms suggestive of a coryza at the onset or decline. William Neill, in an analysis of the last 100 of my histories of anterior poliomyelitis, found only 3.1 per cent. with throat and nose symptoms at the onset. At the same time we must bear in mind the frequency of the reflex gastro-enteric symptoms of central origin at the onset of other infections.

PATHOLOGY.

Provost, in 1865, gave quite a good account of the lesion in this disease. Congestion and hemorrhage are seen as gross lesions in the grey matter in the spinal cord and medulla, but not exclusively confined to the anterior horns. Flexner has added much to our knowledge of the pathology of anterior poliomyelitis.

Microscopically, the lesions are found in the brain and cord, but more markedly in the latter than the former, and in the grey matter and membranes of the cord more than in the white matter. No part of the cord and medulla escape, but the lesions are more extensive at the levels of the paralyzed groups. Mononuclear infiltration forming collars around the bloodvessels preponderate, and in the membranes of the cord there is an interstitial invasion and no exudate. There is edema of the perivascular spaces and sometimes hemorrhage. Both the anterior, posterior horns and commissures are involved, but chiefly the first named, as the central arteries enter the anterior median fissures.

That the cervical and lumbar enlargements have a more abundant arterial blood supply accounts for the greater severity of the lesion at these points. Both the nerve cells and nerve fibers in the intervertebral ganglia may be the seat of degeneration and necrosis. Severe degeneration and necrosis are not recovered from and lead to permanent paralysis, but edematous conditions and anemic occlusion of

vessels from perivascular infiltration explain the transient paralysis. Cerebral involvement may lead to a facial palsy.

Serious degenerative changes in the medulla result in respiratory distress or death in the bulbar form of this disease. Sachs regards infectious meningo-encephalomyelitis as a more correct name than anterior poliomyelitis, since the pathology has been more carefully worked out and the distribution found more extensive.

PREDISPOSING CAUSES.

In contrast to acute cerebro-spinal meningitis which appears in winter and early spring, anterior poliomyelitis is essentially a disease of the summer and early fall, and is most frequently noted during an especially hot spell. As a rule, dry summers seem to have a tendency to lead to more cases than wet ones. In my series, Neill found January, 5 per cent.; February, 6 per cent.; March, 9 per cent.; April, 7 per cent.; May, 9 per cent.; June, 8 per cent.; July, 8 per cent.; August, 8 per cent.; September, 9 per cent.; October, 15 per cent.; November, 10 per cent.; December, 6 per cent.

In many of the histories obtained by the writer, chilling of the body seemed to play some part, as parents after an exceedingly hot day would take a young child, insufficiently protected, to "cool off" in a buggy ride, trolley or motor car. Some children who have gone to sleep on the grass or on the basement floor were soon seized by an attack of paralysis.

SYMPTOMS.

Premonitory symptoms are very probably due to *lepto-meningeal irritation* or implantation of the virus, and are usually present one to three days before the acute symptoms begin. They consist of more or less rigidity of the spine and neck, and Kernig's sign with unequal rigidity in the two legs. At this time the knee reflex may be increased only to disappear entirely after the acute stage is reached. Sometimes there is a slight weakness in one or both legs. Acute symptoms appear in from four to fourteen days after exposure in the epidemic form, but in the majority of the so-called sporadic cases seen it is next to impossible to trace the source of infection and period of incubation.

The symptoms divide themselves into cerebral, bulbar, spinal and neuritic types, depending upon the region chiefly involved. In the cerebral form convulsions, delirium and drowsiness are present, but this type is rare. In the bulbar form we see the respiratory distress, and 75 per cent. of these constitute the rapidly fatal cases of this disease. The neuritic types are those presenting marked hyperesthesia and severe pain in the extremities along the larger nerve trunks especially, and even also in the chest and abdomen, so that the slightest movement, jarring or moving of the bed clothes produces suffering. The onset begins with slight fever (99-101° F.) the first day, with flushed face, intense headache, backache and increased unilateral Kernig's sign.

Except in the mildest cases, the fever on the second day is highest, but rarely goes to 105°, usually not being over 102°. The pulse ranges from 120 to 140, but is usually of good tone and well sustained, except in the bulbar type.

Spasticity in the neck, spine and legs is more marked the second day. Tremors and clonic movements may be present, but sleep is quiet, as there is more or less drowsiness. Nausea and vomiting may be the first symptoms noted and lead one to think the trouble is primarily gastro-enteric, but these symptoms may be central in origin.

Constipation of the bowels is invariable, and of very nearly as great frequency one finds *retention of urine*, so that catherization may have to be resorted to, though this is rarely necessary.

On the third day the fever abates, and on that day or the day following the paralysis appears, converting the previously rather spastic limb into a flaccid one. With the subsidence of the fever there may be some sweating. The headache and backache disappear, but with the paralysis the hyperesthesia begins, if the case is of the neuritic variety.

There are also shooting neuralgic pains, at times lasting for a few seconds or a few minutes and recurring several times an hour at first. These shooting pains disturb the sleep, probably due to the child moving in the sleep. They cry out much as those do who have acute tuberculous articular disease, with a characteristic "night cry." Occasionally there is an erythematous rash, not so fine as scarlet fever and less spotted than measles. Large rose spots may occur on the body at times, later being pigmented. In a very few cases purpuric spots appear in the lower extremities.

PARALYSIS.

A severe general paralysis at the onset may clear up in a few days, weeks or months, leaving paralyzed only those muscles that receive innervation from the necrosed segments of cord. Paralysis of the legs is much more common than in the arms. The most frequent permanent leg paralysis is seen in the extensors of the toes and tibialis anticus.

Next in frequency is the quadriceps extensor of the leg, and often associated with it is paralysis of the adductors, in my experience.

At times the psoas and iliacus are also involved, but usually only in conjunction with the other lower leg muscles.

Of the hamstrings the biceps escapes most often and the sartorius of the anterior thigh group is equally fortunate. The calf muscles and flexors of the toes are not nearly so frequently involved as are the anterior group.

As a rule, if a paraplegia exists there is frequently entire dissimilarity on the two sides. Often one side will clear up in six to twelve months.

Of the contracture deformities seen, flexion and outward rotation of the thigh and flexion of the knee are more common than the reverse, owing to the greater frequency of paralysis in the antagonistic groups, although Sever, at the Children's Hospital, Boston, finds adductor paralysis less frequently than we do.

Of the foot deformities in their order of frequency may be named in my experience talipes equinus, talipes valgus or paralytic flat foot, talipes equino-varus, talipes cavus and talipes calcaneus. Similarly in the arm the distribution of the paralysis is asymmetrical, depending on the necrosis in the segments involved, but the deltoid, supra- and infra-spinatus, triceps, biceps, supinators, extensors of the fingers, thenar and hypothenar groups suffer, in the order named, most frequently.

The quadratus lumborum, serratus magnus and erector spinae, if the back muscles are involved, most often suffer, while the pectoralis major is the anterior muscle of the thorax most commonly paralyzed. The abdominal muscles, the diaphragm, sterno-cleido-mastoid and trapezius rarely are affected in my experience.

Monoplegia of one leg is the commonest end result; next in frequency is paraplegia, then hemiplegia, then paraplegia with some trunk involvement, and, last of all, both upper and lower extremities.

ATROPHY.

Atrophy becomes marked in from one to six months after the fever and may be extreme. This atrophy involves not only circumferential measurements of the limb, but the bones are also affected in length and circumference. The latter is shown by the *x*-ray. Delayed use of the limb in neglected cases where braces or operative treatment have not been employed in young children leads to the most extreme degree of shortening seen, amounting to three or four inches or more.

Kernig's sign of an asymmetrical type, constipation, retention of urine, spasticity of spine and neck, fever of short duration with subsequent flaccid paralysis, render diagnosis simple, but it may be confused with (1) auto-intoxication with vomiting and constipation, (2) rheumatism, (3) typhoid fever, (4) la grippe, and (5) cerebro-spinal meningitis. The first four should not present any serious difficulties and lumbar puncture would clear up the diagnosis in the last. The presence of brief fever, unilateral Kernig's sign and flaccid paralysis should render diagnosis obscure only a day or two.

DIAGNOSIS.

In addition to the early symptoms named, Flexner has shown that the cerebro-spinal fluid obtained by lumbar puncture shows characteristic changes in the acute stages which are of diagnostic value. There may be a slight increase in the amount and pressure of the fluid during the incubation period with progressive increase in the cellular elements, especially the lymphocytes, so that at the height of the disease the fluid previously clear becomes opalescent and undergoes a spontaneous coagulation from excess of protein. As the disease abates it reassumes its normal clearness and non-coaguability. The opalescent fluid is potent in reproducing the disease while the clear cerebro-spinal fluid is not.

ISOLATION TREATMENT.

With the increasing numbers of cases of anterior poliomyelitis and the generally accepted discovery of Flexner as to the bacterial cause—together with the sad lessons learned from recent epidemics of this disease—if a physician is called to see a child in the summer, with vomiting, constipation, Kernig's sign, retention of urine, rigidity of the neck and spine and moderate fever, *isolation is his first duty*. If a mistake is made in diagnosis, no great harm is done if the situation is explained in advance to the parents.

There is no question that it is the duty of State Boards of Health to insist upon the immediate reporting of all cases of infantile paralysis. Neglect of these two points is undoubtedly responsible for the alarming increase in this disease. In my own series *four times as many cases* were seen in 1910 as in any of the previous fifteen years since the Hospital for Crippled Children was established. Through the kindness of Dr. G. Lane Taneyhill, Jr., the following figures—which speak for themselves—were given me of acute cases from Dr. H. M. Thomas' out-patient clinic at the Johns Hopkins Hospital: 1907, 24; 1908, 15; 1909, 51 cases.

ELIMINATION.

To get rid of the systemic infection elimination by the bowels, a difficult thing to accomplish on account of the atony, must be gained by broken doses of calomel and soda followed by one or more doses of castor oil, if the first doses of oil are vomited. Enemata first of cotton seed and olive oil followed, if necessary, by soap suds, then by glycerin, epsom salts (each two ounces) and water, a pint, will be effectual. When the bowels are moved, usually by the second or third enema, the bladder will be emptied at the same time voluntarily. Hot wet packs will stimulate the skin to action as well as relieve hyperesthesia. The same may be said of hot baths. Drinking freely of water is to be encouraged to promote elmination by skin and kidneys.

SYMPTOMATIC TREATMENT.

Cold compresses or ice caps should be kept on the head. I have felt some gain from counter irritation over the lumbar spine by tincture of iodine or mustard, short of blistering, in the acute stage of paraplegia, but as the patient must needs lie on the back, care should be taken that this is not carried too far.

Urotropin, as it rapidly appears in the cerebrospinal fluid, may be used to advantage in doses of 1 to 2 grains every two hours for the first three days. It was first recommended by Cushing, of Baltimore; Adams and McClanahan, of Nebraska, speak well of it. Anderson, however, says in his 279 cases it was given with uncertain results.

High fever is best treated by cold sponging and not by coal tar products. Lumbar puncture is often of value, not only for diagnosis, but for relief of pressure symptoms, especially in bulbar symptoms of respiratory failure, such as cyanosis, shortness of breath, pallor and anxious facies. Lumbar puncture should be done with the most scrupulous asepsis between the third and fourth lumbar vertebrae, with the child on the side and the spine well flexed. Oxygen inhalation may be of some slight help in cyanosis. The warm bath and gentle passive movements while in the bath have helped the neuritic pain.

MASSAGE, ELECTRICITY AND BAKING.

After the subsidence of the fever and intense pain, massage in skilled hands should be begun and preferably the slowly interrupted Faradic current effected by the pendulum attachment should be applied over the origin or nodel points and insertion of the weakened muscles to stimulate not only the circulation and nutrition, but to obtain any slight remaining power of contraction. Children tolerate this better than the "buzzing" variety of Faradic, and this is an important consideration with babies and timid young children. In the long run it has been more useful to me than the galvanic or sinusoidal. With the galvanic current in paralyzed muscles we obtain "the reaction of degeneration," or a stronger contraction with anodal closure than with cathodal, the reverse of the normal behavior; but this is of diagnostic rather than therapeutic value.

These paralyzed limbs are cyanotic and cold in winter and the children find great comfort from the gas or electric baking ovens, which we usually employ before the massage and electricity, for the skin is moistened thereby and the electricity is thereby more efficient in producing muscular contraction when any vestige of life is left, than when the skin is dry.

The masseuse must be especially taught what muscles are and what *antagonistic muscles must be well stretched* to prevent contraction and thereby give the weakened muscles a chance to regain their tone. If this is done at the start and persisted in, no contractures should occur which will require tenatomy or myotomy later. Passive movements, assisted active movements and resisted active movements in turn also help materially.

During the acute stages the attending physician should see to it that the child lies flat on the back and the limbs are held straight, not in positions likely to produce contractures, such as adduction, abduction, flexion, etc. So also the feet should be protected from pressure of the bed clothes leading to equinus varus, etc. Dislocation of the hip from overactivity of the adductors, as recently emphasized by Sever, can be avoided by heeding this precaution.

BRACES.

As soon as acute symptoms subside, if the child cannot bear weight on either one or both limbs without producing distortion, proper braces and shoes must be designed and prescribed by the surgeon to *meet the requirements of the individual case.* No ready-made brace or haphazard application at a brace-shop should be considered any more than ready-made eyeglasses for the visually defective.

Get the child on its feet as soon as possible, as no stimulus is as good as an effort at assisted physiological use. Further, we orthopedic surgeons are all agreed that nothing stimulates growth, power and development of both bone and sinew more than physiological functional use, and yet we meet those—in the profession, too—who claim that

braces produce only atrophy, and that it is much better to let the child get along as best it can without them in vicious positions. This may do, with resulting distorted members showing the most extreme grade of atrophy seen, and for which, later, we by operative measures are expected to obtain satisfactory results. A case of my series illustrates this well. This case, a boy, R. E., first seen when three years old, had contracture of the sartorius, tensor femoris and gluteus medius, so that the thigh was held at right angles with the body. Operation was declined by the parents at the time, but they returned for operation when he was eleven years old, and it was then found there was *three inches* bone shortening. Normal epiphyseal stimulation had been lacking some eight years.

Before speaking of operative procedures I wish, therefore, to go on record as advocating the early use of braces, and in fact the use of braces in all cases in which the lost balance of power or the effect of gravity may lead to distortion, with or without surgical intervention.

OPERATIVE TREATMENT.

The operative procedures of which we avail ourselves in infantile paralysis may be divided into: Tenotomy, myotomy, tendon transplantation, muscle transplantation, tendon shortening or tendon lengthening, arthrodesis, tenodesis, astragalectomy, osteotomy and nerve anastomosis or grafting. Of the first two named nothing further need be said, as the procedures have been of such common performance since 1831, in the days of Delpech and Stromeyer, and orthopedists daily now employ them the world over in correcting deformities by severing the overactive muscles and lengthening them thereby; this overactivity due to a paretic condition in the antagonist or antagonistic group is explained by Seligmüller's theories. These operations are of distinct benefit in that they not only restore the normal alignment in the members, but relieve the remaining weakened living muscular fibers in the paretic muscle from overstrain, which in itself is a detriment. As a rule, some mechanical device to prevent recontracture of the over-strong muscle is required. Frequently tenotomy, myotomy or even osteotomy is required as a preliminary operation to correct distortion some months prior to a secondary operation of tendon or muscle transference, the latter aiming chiefly to restore the balance of power and physiological function.

TENDON TRANSPLANTATION TO TENDON.

Tendon transplantation or transference, first popularized in 1893 by Nicoladoni abroad, and in this country by Goldthwait, gave us hope that the attachment of the distal tendon of the weakened muscle to one still alive and functionally active would help restore support and use to the paralyzed tendon, but only in rare instances have these cases yielded results which enabled the patient to do without artificial support. Dane's statistics of fifty cases from the Children's Hospital, Boston, were discouraging.

TENDON TRANSPLANTATION TO PERIOSTEUM.

Since 1900, by means of the new method of Lange, as it is called, in contradistinction to the older method of Nicoladoni, one sutures the *tendon to the periosteum,* or actually passes the tendon through a bony canal, reduplicates it on and sutures it to itself, seems to have maintained the desired muscular tension much better and accomplished the aim we have in view more satisfactorily in the writer's hands, and as reported by Hoffa, Augustus Wilson, Dane, Le Breton and others. Lange's method of elongating short tendons by means of silk sutures—preferably white—coated with paraffin, and giving these a periosteal attachment, has also yielded good results in my experience. Distinctly disappointing to the writer, however, have been the results of the operation for the relief of paralytic flat foot seen in those cases in which the tibialis anticus and posticus were paralyzed and the extensor longus hallucis had retained its vitality and tonicity, and is advocated by Mutter and others, a tunnel and transplantation had been made through the scaphoid, internal cuneiform or first metatarsal.

In these cases infinitely better results are to be obtained, as one would naturally expect, from a logical, mechanical study of the problem, by taking either the peroneus longus or brevis tendon, preferably the latter, and suturizing it into the scaphoid, for thereby we create *a balance of power* from the active tonicity of the two peronei, one on the outer side of the foot and one on the inner side, whereas, with hallucis transplantation, one small muscle is pulling against the two strong peronei muscles.

In the operation of using the extensor longus hallucis one will almost invariably find it is by no means, even though possessing normal contractibility, equal to the task of holding up the arch and restoring the normal adduction of the foot when opposed to the combined overactivity of the two peronei. It is needless to say how ridiculous—mechanically and anatomically—it is to take "slips" from the tendo Achilles for the correction of valgus of varus, as advanced by some tyros.

By all surgeons who have done a large amount of tendon transplantation the one great essential to be borne in mind—as pointed out by Schantz—is that the transplanted tendon and muscle must *pull in a straight line* and not around a corner, so to speak, from origin of insertion, for the best mechanical and functional results.

IMPORTANCE OF THE ANNULAR LIGAMENTS.

An additonal point of value the writer wishes to call to the attention of the profession in this work on the extremities, is the utilization of the annular ligament. If the muscle and tendon is transferred from the origin to the new insertion through the subcutaneous fat by no means the normal tension can be maintained, and, furthermore, there is an unsightly ridge under the skin, whereas both of these objections are obviated by passing the tendon under one of the thecal compartments of the annular ligament in line with the new and desired direction of traction.

THE WRITER'S TECNIC.

After the circulation has been shut off by the Esmarch bloodless bandage and torniquet in the usual manner, four small incisions are made as follows: First, at the insertion of the overactive muscle, which is severed as low down as possible; second, over that portion of the same muscle where the muscular fibers first become tendinous; through this wound the freed tendon is withdrawn and the whole covered with a wet, normal salt solution sponge to prevent drying of the tissues; third, at the proposed insertion down to the periosteum; and fourth, over the annular ligament.

Lange's curved tendon forceps or a hemostat is passed from the annular ligament wound through the subcutaneous fat to the belly of the muscle, where the freed distal end of the tendon is passed and drawn down to the annular ligament. A very small hemostat, after the exact direction desired is determined, is passed under the annular ligament through an appropriate compartment and the end grasped and drawn through. If the tendon will not reach to the desired insertion, one or more strands of black braided silk are quilted into the end of the tendon and these are pulled from the bottom of the annular ligament subcutaneously to the desired point of insertion, where it is firmly sewed to the periosteum, which may be incised or not, as the operator deems best and the conditions demand. Lange first pointed out that these silk strands offered a framework for the tendinous tissue to grow about and between. Of course, if the transferred tendon is long enough it may be sewed directly to the periosteum.

Withdrawing the tendon from its sheath, *i. e.*, from "incision one" to "incision two," and ultimately disregarding the old sheath, does not appear to affect the nutrition nor ultimate function of the transferred tendon in the slightest degree. It is possible to imagine a new sheath is regenerated from the subcutaneous and adipose tissues.

I have used repeatedly Lange's heavy braided white silk imbedded in paraffin, after boiling in 1-5000 bichloride, but find in practice that the ordinary black No. 5 braided silk, boiled five minutes in the sterilizer, is all that is necessary. The wounds are closed tightly with the subcuticular continuous silver wire suture and then covered with silver foil, the usual dressing and plaster cast. The stitches are removed on the tenth day, but the cast is continued six weeks. The torniquet is not removed until the plaster dressing is completed.

It is needless to say that the foot or part is put up in overcorrection to overcome the deformity and relieve tension on the transplanted tendon. Massage, passive and then active, then resistive movements, together with slowly interrupted Faradic stimulation, form important adjuncts to the after-treatment of these cases.

MUSCLE TRANSPLANTATION.

Muscle transplantations, which Hoffa employed here, especially in converting the pronator radii teres into a supinator by transference of the two heads to the external from the internal humeral condyle; the sartorius into a pure extensor of the leg by suture into the quadriceps and a portion of the trapezius into a paralyzed deltoid gave good results also. Tubby transplanted the pectoralis major into a serratus magnus satisfactorily.

The writer has had better results in transplanting the active biceps and semi-tendinosus into the region of the tibial tubercle rather than into the patella or attempting to use the sartorius as an extensor of the knee.

Arthrodesis has many champions, including Galloway, Whitman, Dane and Gibney, and all who have tried this procedure in comparison with astragalectomy feel that a somewhat stronger foot is obtained. As Le Breton has pointed out, this operation should not be done on children under ten, as the bones are too cartilagenous to yield good results and prevent a return of motion. Osteotomy is employed only when malpositions can be corrected by no other means. Tenodysis was made use of by Hoffa by taking up and suturing folds of

tendons (tendon shortening) all around a flail joint for immobilization. Lange makes artificial ligaments of silk for the same purpose.

Many are agreed that functional use, and especialy weight bearing, should be most cautiously employed after all of these procedures, when by means of massage, electricity, baking, passive and active motions and the like, the member has been prepared and the muscles strengthened to bear the strain. Six months is a much better limit and will yield much better results than the usual six weeks' interval given after the operation.

NEUROPLASTY.

Neuroplasty promised much as striking directly at the correction of the cause of paralysis, and especially from the very successful cures following experimental and traumatic division of nerves with primary or secondary suture, if the analogy holds good, considering anterior poliomyelitis in the relation of a pathological section of a nerve or nerves.

As a matter of fact, in my own experience, in some ten cases of neuroplasty—and from the report of others—the conclusion seems to be that with more or less impairment of all the nerves in a paralyzed extremity, regeneration from a supposed good nerve by suture into a paralyzed one is of very slight gain. It is like taxing an already weak and run down battery with new connections and more work.

Thus the state of the operative treatment to-day is that the tendon transference direct to a new periosteal insertion or by means of silk-lengthening sutures gives the most brilliant results and, in many instances, may permit the patient a close approximation to normal physiological use without braces.

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ATAXIA AS A LOCALIZING SYMPTOM.

Ataxia of cerebral origin most frequently indicates either cerebellar or quadrigeminal disease. It is easily distinguished from the ataxia of tabes by being practicaly uninfluenced by closing the eyes. Vertigo is frequently present, usually objective, the object moving away from the side of the lesion. A motor symptom of value is the "cerebellar fit," involving the muscles on the side of the lesion. Another indicating cerebellar disease is adiadokokinesis, or the inability to perform rapidly alternating movements. If now to cerebellar ataxia we add involvement of eye muscles and deafness on opposite side, lesions of the corpora quadrigemina may, according to Weinland, be positively diagnosticated.—G. W. McCaskey, in *The Journal of the Indiana State Medical Association.*

SOME EXPERIMENTAL DEMONSTRATIONS IN SURGICAL DRAINAGE—ILLUSTRATED.

CAPILLARITY PER SE CANNOT DRAIN PUS FROM AN ABDOMINAL CAVITY. CAPILLARITY PLUS GRAVITY WILL DRAIN PUS FROM ANY CAVITY.

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Last summer while on a visit South I discovered how the buzzard soars, *i. e.*, flies with or against the wind without flopping its wings. When I arrived home I began to review my physics in order to be able to clearly describe the phenomenon. In doing so I came across a chapter on Capillary Attraction, in which I saw the statement that a *dry* towel held perpendicularly with one end in a basin of water would become completely saturated from end to end. It looked doubtful to me. I tried the experiment. It did not work. I consulted *fifteen* different authors of physics, most of whom concurred in the statement, in one way or another, and none denied it. A *dry* towel so suspended becomes wet above the surface of the water for about *one inch and no more*. I also tried the experiment with a small piece of cotton about eight inches long, and I found that capillary attraction would not draw water up its absorbent fibers any higher than it did in the towel. While experimenting with the cotton, however, I came across another phenomenon, which, for the time being compelled me to lose sight of the buzzard.

The phenomenon is that a piece of absorbent cotton or gauze, or any other absorbent material saturated with any wetting liquid, will not drain from the short end while held in a rough semi-circular position. After proving the utter falsity of the physicist's statement about the towel, and when trying out the dry cotton, it slipped from my fingers and sank to the bottom of the vessel of water. I picked it up and noticed it was dripping rapidly from only one end and that the longest. I was impelled to raise the lowest end a little, and *it* instantly ceased to drop and the other just as promptly started to flow.

I have tried to demonstrate this phenomenon in figure 1. It is so simple that any one can convince himself in a minute that the water will not drain from the short arm. Indeed, by careful manipulation the low end may be raised just in time to arrest a pendant drop in the act of falling, and cause it to lose its globularity (a no mean force), and to be all drawn back up the arm. Surely, this will prove that capillarity *per se* cannot drain pus from

any *deep* cavity with wet, dry, or moist drainage material. It must further be seen that the low arm represents the abdominal cavity and the high end the surface of the abdomen, from which is being dragged up and back the liquid which is already out of the body.

To try to drain a deep perpendicular pus cavity with wet gauze, *reaching only to the surface or extending away at right angles,* is to attempt that which none can do. Place a *super*saturated piece of absorbent cotton in a glass half full of water and hang it over the edge, as seen in figure 2, and any housewife will say that it will empty the glass. It will not; and what is more important to surgery

Fig. 1.

the supersaturated liquid in the cotton hanging outside of the glass will *run up and back into the glass.* Pull the wet cotton over until the outside end is below the surface of the water and it instantly begins to drip. If the cotton is large it will run in a stream, and if only a *single fiber* of the cotton on the inside reaches to the bottom of the glass it will be rapidly drained as dry as though a cat had licked it.

I find no literature in any book on physics that mentions the phenomenon, and all the physicists whom I have personally consulted say that it is due to capillarity. Any one else who thinks so may try a piece of *dry* cotton in a goblet half filled with water and he will find that the cotton will not become wet above the water for more than an inch, no matter how long the cotton is allowed to remain in that position. Move the cotton to the edge of the goblet, as seen in figure 3, and pull it down on the outside below the surface of the water, and no water will creep up and flow over the edge, nor will it budge an inch above the surface. Capillary attraction, then, cannot be the force, for there is nothing better than absorbent cotton to accelerate capillary attraction.

That this phenomenon is not absorption, if absorption can be separated from capillarity, can be seen by a glance at figure 4, which shows ink running through a piece of dry cotton without wetting any of its fibers except just enough for the column of ink to descend upon.

While testing the drainage powers of different materials it occurred to me to see what gauze would do, and I found that a piece of gauze one inch in width and two and a half feet long would drain

Fig. 2.

eight ounces of water out of a graduate in twelve hours. The test is illustrated in figure 5.

Desiring to know how small a piece of gauze would drain, I took one strand of gauze, which is about the size of No. 80 cotton, and dipping one end in water hung the other end over the beaker (the strand had been previously saturated), and was surprised to see it thicken up, but could not get it to drop. I placed two saturated strands in the same position, and they instantly began to drip in drops about the size of No. 5 shot. Four strands exuded drops about twice the size of the others, and ten strands dropped about a minim of water. While doing this experiment I was called away for about fifteen minutes and when I returned I found that the single thread was perfectly dry up over the edge of the glass and down to the water, but that the two strands were still flowing, and thus they continued until the vessel was empty. Remembering the fact that capillary attraction acts with greater power with the inverse ratio of the caliber

of the tube, and thinking the phenomenon *might* be due to capillary attraction I tried a rubber tube with half a mm. caliber, but I found it would not *start itself* and when *sucked and started would not run for more than a minute.* A one mm. saturated rubber tube will not start itself, and when started will not run in a stream like a siphon, but will drip nearly rhythmically for a short time, gradually lengthening the period between drops, and finally, cease to drop in less than thirty minutes. The same sized rubber tube with ten strands (No. 80) supersaturated gauze drawn through it would drain

Fig. 3.

without being sucked when the outer end was hung below the surface of the water. Notice, that a single soaked thread in a tube, or out of it, will not drain but will dry up in a short time—the time being governed by the *humidity* of the atmosphere.

Seeing that the single thread dried up in the atmosphere I placed a small beaker inside of a mason jar and sealed it, and the single thread which would not drip in the air began to drop drops of water the size of mustard seed, and continued to drop for *two days.* The half mm. tube, without gauze, was a continuous dropper and so was the one mm. tube which would not drop continuously outside.

I placed a small soft *solid* rubber filiform bougie in a beaker of water outside the jar and I found that it would not run at all, and that two would run for only half an hour when wet and placed together (a position in which capillary attraction holds them, until evaporation dries them back to near the water's edge, when they separate), but these fibers placed in a *sealed jar* continued to hang together and to flow as long as there was any water in the beaker. The single soft rubber filiform was also a continuous dripper in the jar.

Having been told by a physicist that capillarity, and siphoning both would stop in a vacuum, I arranged my tubes and gauze and filiforms in another jar and exhausted it, and they did not cease to flow. In fact, I could not detect any difference in the flow of any one of them. Be it understood, that the *siphoning tubes continues to flow.*

It may be of interest to learn how I started a siphon in a vacuum. Knowing the power of capillary attraction in a glass tube I took a two mm. cali-

Fig. 4.

ber glass tube and heated it over an alcohol lamp and bent it into a V-shape and hung it in a test tube, as seen in figure 6, being careful not to fill the test tube full enough for the water to run up in the V and over the edge. I then placed a piece of saturated gauze in the higher vessel and allowed it to dip in the test tube. Then I exhausted the jar, and when the dripping from the gauze raised the level of the water in the test tube to within about a half inch of the top, the V-shaped siphon began to flow in a stream and continued to flow just as though *it were not in a vacuum.*

This taught me that it would greatly facilitate all drainage in surgery to have all the dressings covered with oiled silk, or some other impervious material.

I covered the gauze ribbon and put eight ounces of water in the beaker, and found that it drained completely dry in *two hours.* It will be remembered, that it had taken *twelve* hours for the same piece of gauze to drain the same quantity of water when it was unprotected with a cover.

Seeing the one strand of gauze, and the small rubber tubes, and filiforms attacked and overcome by evaporation, I jumped to the conclusion that all gauze would dry down to within an inch of the water edge. Another experiment, however, taught me differently. I cut a strip of gauze three-quarters of an inch wide and eight feet long and after supersaturating it I put (one end of) it into a quart jar of water and then strung the rest over a hook three feet above the jar and allowed it to hang with its outer end below the surface of the water in the jar. This contrivance began to drain but continued for only about fifteen minutes, when evaporation got the better of it and dried it *up* and *down* to about fifteen inches of the water. The gauze above the water remained wet for three weeks, gradually wasting the water out of the jar at the rate of nearly an ounce per diem.

Fig. 5.

Fig. 6.

Mark, in this last experiment the long time it takes to remove the water, and that there is nothing taken out of the jar but pure water. This fact can be graphically demonstrated by placing methyl-blue or cardamon color in the jar. The color will creep up the drainage material but will not leave it.

Surgeons have long known that *small rubber tubes* would not drain, but they doubtless did not know the true reason why they would not. It was thought the tubes become occluded with viscous pus, which is only secondarily true. The paramount reason is that evaporation seizes the watery constituents of the pus and drags them from the rubber faster than they can draw each other up, and thereby destroys the equilibrium in the tube. Let it be seen, too, that this occurs if the tube has been properly placed with its outside end below the bottom of the cavity. When the equilibrium is broken up from the outside then gravity on the inside assisted by evaporation, both in and out, soon empties the tube, and of a consequence it rapidly becomes dry to the very surface of the liquid it was to drain.

After a filiform has been passed into a bladder (if for any reason it is impossible to go further with the operation) it should not be fastened *up* along the abdomen, but *down* over the scrotum. Moreover, it should be wrapped with wet cotton, and the cotton should be made to extend down below the end of the filiform, so as to be sure to give gravity a chance to help capillarity pull out the molecules of urine faster than they are deposited, and, finally, oiled silk should cover it all.

I would suggest that cavities whose openings are parallel to the external end of the drainage material should have the material extended to a place where it could hang pendant, and, inevitably, it should be covered with waxed paper or some other waterproof material.

Cavities whose orifices are below their level will give no trouble nor never did. They would, however, drain better with *gauze* than with a tube, because the gauze could be better manipulated, thereby compelling the pus to take a certain road to a receptacle. Even such a drainage should be covered with an impervious material in order to prevent the opening from becoming blocked up with inspissated pus.

Solid soft rubber rods are utterly useless for

drainage, unless they are covered with a vapor-proof dressing. A single soft rubber rod will not drain under *any* condition. Two such rods when in juxtaposition will drain if *wet* and placed in a pendant position, but only for a short time if not protected from the air.

I have found that all fluids obey this law. Whether they are heavier than pus—such as glycerine, molasses, or heavy petroleum machine oil, or lighter than pus—as is alcohol, ether and water.

Any one following out these experiments will find that it is worse than useless to attempt to drain a pus cavity without having a supersaturated absorbent fiber for drainage material, and that hung with its outer end *below the bottom of the cavity.*

For abdominal work the drainage material should be at least long enough to reach from the bottom of the cavity up the glass tube, *over the abdomen and down to the bed,* or if the formation of the pus is profuse, to a bucket on the floor, as I have found that the longer the pendant arm the more rapid the flow.

The abdominal tube and material should be kept saturated by immersion in a normal salt solution, and then there is no waiting for absorption, but the gauze instantly begins to drain. Hence, there is no need of the slow arbitrary process of removing the gauze daily or oftener, and it really should be oftener, the fact is, it should be moved *hourly,* or as *fast as it becomes saturated, because it can never get out of its own accord.*

When the drainage is accomplished by molecular cohesion, plus gravity, it is continuous from the instant the equilibrium is upset outside of the body, and will continue as long as the pus continues to form, and must of necessity be a hundred times shorter than when the drainage is accomplished only when the *gauze* is lifted out of the tube.

For mouth drainage in dentistry there is nothing better than a piece of soft wire shaped into a hooked T and covered with absorbent cotton. It, of course, must be previously saturated with some liquid, preferably normal salt solution. This devise when hooked in the mouth would convey the saliva away as fast as it collects, and the speed of the flow will be governed by the amount of the saliva, consequently, the patient would not be annoyed by the noise of the suction instrument which some dentists now use. The wearying noise the instrument makes is due to the fact that the same suction force is used whether the salivary glands are secreting much or little. When the suction tube is partly filled it whistles for more.

In ocular surgery tears may be drawn away from the eye leaving a dry field. This experiment I have many times tried, and I am now perfecting an instrument to convey the tears away to a vessel on the bed. Blood, too, can be made to take the same route in ocular work, and from other cavities where sponging cannot be well performed.

What surgeon has not been told by the nurse that a patient had had a restless night, and that his dressings are all wet? The patient had rolled on his side during the night and gave gravity a chance to disturb the equilibrium—and hence the *pus* had been drained out of the cavity and was found spread all over the dressing—and the patient was damned for his unconscious effort to point a law.

In condemning soft rubber filiforms for drainage I want to advocate malleable wire, covered with absorbent cotton in their place. It is true that the filiforms will drain perfectly if they are covered with an absorbent material, but they will not stay in the shape and position in which they are needed and the malleable wire will. I have tried aluminum wire and it fills the bill admirably.

Covered aluminum wire can be plunged into all kinds of cavities and through several openings no matter whether their orifices are at the lowest level or not, for the ever necessary impenetrable overdressing will keep all outlets from plugging up with evaporated pus.

I would also suggest that there might be used a covered wire with a slight spring in its makeup. A spring wire could be looped, and made to hold the wound open, if for any reason there was a contraindication to packing.

What is this phenomenal force which compels gauze to drain pus out of its abdominal cavity? What is this combination of powers which overcomes globularity, viscosity, adhesion, cohesion, absorption, evaporation, and even gravity itself of the short arm. Of course it is not globularity nor viscosity. Molecular *ad*hesion it cannot be, because the pus runs uphill and leaves the gauze. Molecular *co*hesion it is not, for have we not seen that even water will not run up a dry towel? That it is not absorption has been shown by the ink test that the black fluid obeys some greater master, and passes straight through the dry cotton without wetting either side of its path. Molecular adhesion *plus* molecular cohesion is not the power, for have we not seen that a wet semicircular piece of cotton evenly balanced will not drip? Evaporation plus molecular adhesion will not do the work, because evaporation combined with capillary attraction removes nothing from any drainage material but an *invisible vapor.* Nor can it be gravity, *per se,* for have we not seen gravity of the short arm reverse itself and climb up the gauze? *Gravity is a great*

power, but gravity alone cannot drain pus out of a perpendicular cavity. *Unbalanced gravity yoked to capillary attraction is the force.* It is a mighty combination. It is a power that is not confined to small things, for a ton of supersaturated absorbent cotton properly placed over the bank of a mill dam would draw water out of the pond fast enough to run a grist mill! Finally: Bless Capillarity when she is wedded to Gravity; and curse her when she leaves him and flies away with Evaporation.

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SURGICAL COMPLICATIONS OF GONORRHEA.*

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For a long time gonorrhea was looked upon as a trivial infection, both by the laity and by a large number of the medical profession. During recent years, however, this disease has been taken more seriously than formerly, and both the laity and the profession are beginning to realize what a disastrous and far-reaching infection it can be. When we stop to consider that it is responsible for more than 30 per cent. of all blindness, that it is the cause of about 75 per cent. of the pelvic conditions requiring surgical treatment in women, that it is responsible for the large majority of sterile marriages, and that it may attack almost every organ of the body, we are forced to acknowledge that it is a disease worthy of our serious consideration.

Gonorrhea in its incipiency is an infection of the mucous membrane of the anterior urethra. If we stop to consider the anatomy of the parts involved we can appreciate why gonorrhea is not a simple disease to treat and how complications can arise that require surgical treatment.

Since man no longer roams the world without clothing he does not need a long prepuce to protect the glands. Instead of its being of any service now, it is a positive menace to the individual's health. It is always unsanitary, makes gonorrheal infection more easy, and when there is gonorrhea it may complicate the treatment. Phimosis and paraphimosis may develop, making it necessary to divide the prepuce. This can be done under local anesthesia.

*Read before the Fort Wayne Medical Society, Fort Wayne, Ind., May 2, 1911.

The urethra is lined with mucous membrane covered with columnar cells as far as the fossa navicularis where there are squamous cells. In the mucous membrane are numerous minute glands, the *glande of Littré,* with their ducts opening into the urethra. Gonorrheal infection finds its way into these glands thus accounting for the persistence of some cases. If the duct of one of these infected glands should become blocked the infectious contents may find their way into the tissues outside of the urethra and a periurethral abscess forms. Urinary fistula may follow external drainage of this abscess. This may close spontaneously into a short time or it may require surgical treatment for its closure.

Beneath the mucous membrane of the urethra is an exceedingly vascular layer. In fact the entire urethra with its generative adnexa are in such intimate relation to the circulatory system that we can readily understand how gonorrheal infection can enter the blood stream to be carried to remote parts of the body where it continues its destructive work.

The lymphatic system is another avenue for the spread of the infection. The lymphatic vessels of the external male genitalia are divided into two groups: those of the penis and those of the scrotum. The scrotum has proportionately more lymphatics than any other area of the body integument. The vessels extend in curves to the pubis and to the thigh and enter the middle chain of superficial inguinal glands.

The cutaneous vessels of the penis, commencing on both surfaces of the prepuce and from the margin of the urethra wind around the two sides to the dorsum of the organ where they extend to the pubis and curve laterally to either side to enter the first gland of the upper inguinal chain. The lymphatics from the glands penis are exceedingly numerous. They converge toward the frenum of the prepuce where they unite with the lymphatic vessels from the urethra. The urethral lymphatics begin at the prostate and seminal vesicles, and extend forward as a dense net work surrounding the urethra. Opposite the frenum two or three trunks penetrate the urethral wall, join the trunks from the glands, then penetrate the substance of the penis. Reaching the dorsum of the corpus spongiosum the two groups unite to form a single vessel which follows the course of the deep bloodvessels to the pubis, again dividing to send a branch to each side which enters the median inguinal chain.

The lymphatics from the testicle and epididymis extend through the inguinal canal into the abdom-

inal cavity, are joined by vessels from the seminal vesicles and finally terminate in the lumbar glands. This is important to know as will be seen later.

The urethra has in it many openings through which infection may pass and be carried to other structures where it often causes serious trouble. The ducts of the glands of Littré have already been mentioned. The two ducts from *Cowper's glands* communicate with the urethra in front of the anterior layer of the triangular ligament.

These openings are very small and gonorrheal infection of Cowper's glands is rather infrequent. When there is abscess formation in one of these glands it is very painful, and produces marked perineal tenderness and swelling located more anteriorly than in the ordinary perineal abscess. When these glands are infected we suspect tuberculous infection. The treatment is incision and drainage, and if the infection is not tuberculous, rapid restitution takes place, but if tuberculous there may remain a fistulous tract for a long time. It is always advisable to examine the pus for tubercle bacilli as well as gonococci and other organisms.

Following the urethra back as the infection does in probably 90 per cent. of all cases, it reaches the prostatic portion, communicating with other structures through a number of avenues along with infection may extend. The largest of these is the internal urinary meatus through which infection extends into the bladder, causing *gonorrheal cystitis*—but this is not a surgical complication.

The tubules from the acini of the prostatic glandular structure, opening into the floor of the urethra, are particularly exposed, and very frequently there is *abscess formation in the prostate gland.* This may develop as early as the third week of the patient's primary infection or it may be months or years later during an acute exacerbation of an old chronic posterior urethritis, which has been lighted up by excesses and dissipation or by too vigorous and heroic treatment of the posterior urethra.

The general symptoms are those common to confined pus, such as malaise, chills, fever, loss of appetite, etc. The local symptoms are painful bowel evacuation, painful micturition, perineal tenderness, with possibly swelling, and the patient is unable to sit or walk without discomfort. He is most comfortable when in the recumbent posture. I have seen this condition attended with an almost uncontrollable diarrhea which I attributed to the toxemia. This intestinal disturbance stopped immediately after the abscess was drained.

Often a prostatic abscess, following the lines of least resistance, will rupture spontaneously either into the urethra or rectum, seldom if ever into the peritoneal cavity. Upon digital examination per rectum, one side of the prostate, seldom both sides, is found to be enlarged, soft and tender. If rupture has already occurred into the urethra, pressure on the gland will cause pus to come from the urethra. If the condition are growing worse and rupture does not take place, a perineal incision into the pus cavity should be made and drainage instituted. Relief is instant, pronounced, and gratefully received as soon as the abscess opens or is opened. If the rupture has been spontaneous, it is advisable to *gently* press out the contents of the abscess cavity once daily for several days. It has been my observation that these cavities do not have a tendency to refill after ten days or two weeks. About the time one side is cleared up, the other side may become infected and it is to be treated in the same way.

The verumontanum has within it a small cavity which often becomes infected and which is the seat of trouble in many cases of obstinate posterior urethritis. The condition of this little structure can be observed and treated through the urethroscope. It may be necessary only to inject into this cavity some medicament or it may require amputation which can be easily done through the urethroscope.

In the region of the anterior portion of the verumontanum are two openings, the ejaculatory ducts. These communicate with the seminal vesicles, through the vas deferens with the epididymis, and through the latter with the testicle. Of these three structures the epididymis is most frequently attacked. *Gonorrheal epididymitis* rarely develops before the third week of the urethral infection and seldom goes on to abscess formation. Slight trauma to testicle and epididymis may precipitate an attack. The infection usually lodges in the tail of the epididymis but it may invade the *testicle.* It is usually unilateral and is more frequent on the left side. The pathology of this process is that of an acute inflammation during which time the seminiferous tubules are swollen, the walls are infiltrated and edematous, and the tissues about the tubules are in the same condition. There may be semen and pus in the tubules. After a day or so the tunica cvaginalis may become inflamed and an increasing amount of serum accumulates in this sac, producing a very painful *acute hydrocele.* Simple aspiration of this fluid often gives the patient great relief.

It may be necessary to repeat this several times

at intervals of 24 to 72 hours. The dydrocele may remain and require a radical operation later.

In a great many of the cases of gonorrheal epididymitis the inflammatory exudate gradually resolves, but during repair connective tissue changes take place and hard nodules are left, which may occlude permanently the tubules and thus prevent the passage of spermatozoa. This explains the resulting sterility. These nodules may invite tuberculous infection later. Under the usual treatment of rest in bed, support of the parts, and cold or hot applications, the symptoms usually subside in from a few days to two weeks.

A few years ago Hagner conceived the idea that early drainage would shorten the attack and lessen the liability to sterility. He makes an incision through the scrotum so that the epididymis can be exposed. The tunica vaginalis is opened and the testicle with the epididymis is held firmly. The epididymis is punctured in several places with a very sharp pointed knife. If pus is found in any of the small punctures, the incision is enlarged and the cavity is washed out with a 1-1000 bichloride of mercury solution, followed by salt solution. The parts are cleaned off, and gauge drainage is introduced, but allow to remain only for a few days.

My experience with this operation is too limited to be of much value, but if early puncture and drainage will shorten the attack and lessen the liability to sterility, which I believe it will, it is to be recommended. The immediate benefits from this operation is sudden cessation of pain, fall of temperature and drop in the leucocyte count, from 25,000 or 30,000 to about 6,500.

The secondary urethral discharge, too, seems to be less difficult to control.

Chronic hydrocele often follows gonorrheal epididymitis. This is best treated with radical surgery; that is, removal of that portion of the hydrocele sac that is not attached to the testicle and epididymis.

Closely associated with epididymitis is *seminal vesiculitis*.. The seminal vesicles communicate with the urethra through the ejaculatory ducts and are therefore exposed to infection, which occurs more frequently than many think it does. Examination of the seminal vesicles in cases of persistent urethral infection with irritable bladders, symptoms of cystitis and lumbar pains, often reveals the cause of the obstinacy. The vesicles, which can scarcely be palpated when normal, are found to be enlarged, soft, tender, and many pus cells and few spermatozoa are found in the expressed contents. Careful, intelligent massage of the vesicles together with proper treatment of the urethra usually brings about a cure in most cases. Still there are some that do not clear up under this treatment and little the wonder when we recall the interior arrangement of the vesicles. In fact, the tortuous interior with the numerous diverticular or little sacs would seem to preclude any satisfactory treatment other than complete removal.

For these persistent cases of vesiculitis, Belfield has recommended an operation whereby the pus can be drained and the cavity of the vesicles treated. The vas deferens is opened just above the epididymis and a ½ per cent. solution of protargol or 5 per cent. argyol is introduced by means of a small hand syringe.

The incision in the vas is kept open for drainage and subsequent treatment if necessary. Benefit from this operation is probably due to the drainage more than to the drug injected. While it is possible to do this operation under local anesthesia in one's office, I believe it is better and safer to have the patient in the hospital for at least 24 hours. In several cases this treatment has proven very satisfactory.

Fuller prefers the more radical operation of opening the seminal vesicles through an incision at the side of the rectum and draining them directly. He recommends this method of treatment for the early severe cases and claims for it immediate relief of painful symptoms, and a more rapid recovery, thus saving the patient both time and suffering. I would recommend this operation as a last choice after all the other simpler methods have failed, rather than as a routine treatment in all cases.

Lymphadenitis is present in many cases to some degree. This may vary from a slight inflammatory involvement to pus formation. One or many glands may be involved. It is usually on the same side as the noticeable lesion on the glands or prepuce, if one be present, or both inguinal regions may be involved simultaneously. Pus formation is often slow. All of the upper groups of glands may be enlarged, tender, with a great deal of periglandular inflammation. Many times the appearances are deceptive and one is lead to incise these glands for the release of pus and no pus escapes. This chagrins the physician and disappoints the patient. Such glands, if left alone or simply incised, will proceed very slowly through a long, tedious course of inflammation, pus formation, discharge of pus, and finally repair. During the greater part of this time the patient is incapacitated for work, suffers great pain and is losing time, as this often covers a period of many weeks. This class of cases is best

treated by dissection and removal of the glands involved when it is evident that rest and cold applications will not check the progress of the inflammation. The patient is given a general anesthetic and through an incision, just large enough to introduce the index finger, the entire mass is removed. The glands near the iliac vein are usually involved and here careful dissection must be made in order not to damage the vein. The cavity is lightly packed with gauze for drainage and to control hemorrhage. This packing is removed in 24 hours. It does but little good to suture the incision as the edges do not unite very rapidly, hence the importance of a small incision. If the cavity is slow in healing, or if there be a purulent discharge, cleanse the cavity with hot sterile water and introduce a ½ per cent. solution of basic fuchsin. After ten minutes wash out with a solution of warm salt water. Two or three such treatment at intervals of 48 hours produces a clean cavity which closes very rapidly. The advantage of radical removal are that the patient is immediately relieved of the pain, he is able to resume his work in a few days, thus saving him much loss of time, which means money to most men, and the resulting scar is small and not disfiguring.

Gonorrheal infection of an axillary gland following infection of a scratch on the forehead was reported in the *American Medical Journal*, April 30, 1910. Shortly after the infection on the forehead, other pustules formed in succession on the side of the face and neck, four in all. A little later the axillary gland showed evidenced of infection and suppuration, was incised and gonococci were found in the pus. This was an unsual case in many ways, and reminds us that it is the unexpected that often happens, and that we should search for many causes of trouble in all obscure cases.

Another infrequent complication of long standing chronic gonnorrhea is *"painful heel."* It is due to an exostosis on the os calcis. Just why this particular region should be selected for an exostosis from gonorrhea I am not prepared to state. This condition may be mistaken for rheumatism, that medical mantel which covers so many indefinite pathological conditions. It has probably often been diagnosed as flat foot, neuritis, or tuberculosis. It is an ossifying periostitis where the flexor brevis digitorum muscle is attached to the os calcis. Pain is more pronounced when the patient is standing and it extends to the muscles of leg. The patient walks slowly and carefully, selecting his ground, and throws the body weight on the anterior part of the foot. Little can be seen, but nodules can be felt. Antisyphilitic treatment should be tried.

The treatment consists in exposing the nodules through an incision on the inner side of the heel parallel to the plantar fascia, and curetting or chiseling away the exostosis. It is not necessary to drain. The patient is kept at rest for ten days or two weeks. Results are satisfactory.

While *surgery of the eye* is not in the domain of the genito-urinary surgeon, it can be mentioned here that not only is the usefulness of the eye destroyed by gonorrhea, but that sometimes enucleation becomes necessary.

Arthritis is a most common complication of specific urethritis. It is said to occur in more than 2 per cent. of all cases, but my experience has not found that high a percentage. The joints attacked are, in the order of their frequency, the knee, ankle, wrist, elbow, shoulder, hip. This complication may occur as early as the fifth day of the disease but usually it appears during the chronic stage. When a joint is attacked it goes through the following stages unless its progress is checked: 1st, hydrops; that is, increased amount of fluid in the joint; 2d, formation of sero-fibrinous exudate; 3d, suppuration; 4th, ankylosis. It is the aim of the surgeon to prevent ankylosis.

During the first stage the joint may be aspirated under the strictest asepsis. Removal of the fluid gives relief from severe pain and may stop further progress of the disease. If mixed infection is present, aspirate, make autogenous vaccines and use these according to the needs of the case.

This is often very satisfactory. The aspirations may be repeated several times. If necessary, slight passive motion should be instituted early. Active hyperemia, or what is better, passive hyperemia according to Bier's method, is very beneficial. Notwithstanding all this, ankylosis does occur, and when it does it is a serious and difficult surgical problem. Forcibly breaking up the adhesions does little or no good. Opening the joint, which in reality is no longer a joint, and interposing fascia to form new articular surfaces has been successful in some cases. This treatment is best suited to the knee and elbow. Every possible means and the greatest diligence should be used to prevent ankylosis.

Gonococcal infection of the kidney is very infrequent, but there are probably many more cases than have been reported. Such infections were not suspected until a few years ago. More cases will be found when more of the profession look for them.

The diagnosis must not be made from the simple fact that during the process of a gonorrheal ure-

thritis the patient shows symptoms referable to the kidney. A positive diagnosis rests upon the actual and unquestionable finding of gonococci in the urine or pus from the kidney or in the kidney itself. This can be done through the ureteral catheter or by exposing the kidney.

Infection may reach the kidney through the ureter or through the lymph and blood stream. Extension of gonococci up the ureter is difficult under ordinary circumstances. The ureteral orifice in the bladder is closed except when there is urine escaping, thus it prevents the entrance and passage of infectious organisms.

However, let there be an obstruction to the escape of urine or an injury to the ureteral mucosa, then the resistance to infection becomes lowered. It has been demonstrated experimentally in animals that if one ureter be ligated and a pure culture of staphylococcus aureus be introduced in the jugular vein, the kidney with the ligated ureter becomes infected. Gonorrheal pyelitis, simple and uncomplicated, is therefore improbable if not impossible.

Some claims that infection can reach the kidney through the lymphatics without the bladder involvement. The danger of renal infection is in direct proportion to the surfaces involved in gonorrheal complications. The bladder wall is poorly supplied with lymphatics, but there is lymphatic communication between the epididymis, seminal vesicles and the kidney.

Since gonococci have been demonstrated in the blood it seems that this would be the most logical route for invasion of the kidney. The normal kidney is not very susceptible to infection as it is well known that many varieties of bacteria are separated from the blood with the urine without infecting the kidney. The gonococci in the kidney may not do much damage until invasion by secondary organisms, when symptoms of pyonephrosis are produced.

Tuberculous infection of the kidney may be secondary to gonorrheal invasion. Careful study and thorough examination of all cases of kidney involvement in patients who have had gonococcal infection is very important and valuable.

Having made a diagnosis, the kidney should be exposed through a lumbar incision and dealt with according to the conditions found. If a single abscess be present it should be drained, but if the kidney is largely destroyed and if there is tuberculosis present, nephrectomy is indicated. Never fail to demonstrate the presence and activity of another kidney, before one is sacrificed.

Stricture of the urethra is a very frequent complication of gonorrhea. It may develop within 18 months from the patient's first urethritis, but usually it appears later. It may not give any trouble for 15 or 20 years. Strictures receive more abuse and unscientific treatment than any other pathological condition. A *few* treatments with sounds will control most cases in their incipiency. No case should be overtreated. Almost every stricture can be satisfactorily treated without incision. If a filiform can be passed, further dilatation is usually easy and rapid. In the treatment of strictures, *patience is a virtue*. *No force* should ever be used in passing instruments through the urethra. Internal urethrotomy is mentioned only to be condemned. External urethrotomy for stricture is seldom indicated. Neglected cases may cause urethral rupture and extravasation of urine into the perineum and scrotum, causing gangrene and sloughing, a very disastrous complication. Hence the importance of the early recognition of stricture and of early and proper treatment.

In conclusion, let me again emphasize the value of careful study of all cases, never forgetting the great prevalence and activity of the gonococcus.

SURGICAL ESSENTIALS.

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THE STERILIZATION OF UTENSILS AND INSTRUMENTS FOR OPERATION.

It has long ago been determined that sterilization by boiling is far more reliable than sterilization by disinfection, and the practice of attempting to render operating-room utensils aseptic by other means than by boiling has largely been abolished. For this purpose every well equipped operating-room should have a seperate *utensil sterilizer*. It should not be a small model, but of such dimensions that, without exception, every article in the operating theater which directly or indirectly might come in contact with sterile solutions, materials or instruments or the gloved hands of the surgeon, has room in it. This includes *all* containers and receptacles intended for use at the operation, basins or tanks for sterile solutions, trays for materials and instruments, and also the plates of the operating and supply tables. Glass is heavy, easily chipped and fragile. Agateware, though less attractive, is much more serviceable. The customary glass panels on

operating tables are easily dislodged and broken and could well be replaced by plates of agate or enameled ware which are *not laid into a framework* like panels but cover the underlying supports and can be removed and rendered absolutely sterile by boiling. Similarly there might be substituted in place of the glass top of the supply table a plate of the same ware consisting of a number of smaller segments with shallow interlocking grooves, so that they can be folded upon each other or detached and put into the sterilizer.

Under the heading of operating-room utensils are comprehended:

1. Containers for sterile solutions.

2. Utensils required during the scrubbing of the patient and for irrigation.

3. Receptacles for waste materials and bacterial secretions.

In the modern operating-room where ample provision is made for the mechanical cleaning of the hands and arms with sterile soft soap, sterile brushes and warm running sterilized water from a conveniently situated tap, the numerous basins with solutions for the hands become superfluous. All that is necessary in their place is one sterile basin containing about a dozen sterile gauze sponges saturated with strong alcohol. The alcohol is needed to locate small wounds, to remove the residual moisture and close the relaxed pores, after the scrubbing and drying of the hands and arms has been attended to with due care.

On each side of the operating table, within easy reach, there should be a basin for sterile water in which the gloves may be rinsed during the operation. A third basin is reserved for the nurse at the supply table.

In general the same principles that are followed in preparing the hands for operation also hold good in rendering the field of operation surgically clean. The soap and water routine can be exactly the same except that here gauze is preferred by many to the harsher brush. Consequently the accessories are also few in number. Here warm sterile water from an *irrigator* takes the place of running water. After drying, a little strong alcohol is allowed to complete the dehydration of the surface. For this, another *small sterile basin* with a few gauze sponges soaked in alcohol, is kept in readiness by the nurse.

The *irrigator* apparatus referred to consists of two reservoirs or tanks of agateware each holding not less than a gallon of fluid. Connected with each of these is a rubber tube at the end of which is a slender metal canula or nozzle with a stopcock to regulate and control the flow. The tanks are suspended from a stand on which they can be easily raised to increase the hydrostatic pressure or lowered for the convenience of the nurse in refilling or detaching. The refilling of the tank is very simple and can be done best by means of a *sterile pitcher*. The sterilization of the tanks, tubes and nozzles is accomplished before the operation: both irrigating apparatuses are disconnected from the stand and boiled together with the other utensils. Pending their use the attached nozzles may be safely lodged in the tanks to which they belong, submerged in the irrigating solution. Sterile water fills the one, the other contains the solution indicated by the surgeon, for example, tanic acid or zinc sulphate which are to act as astringents to facilitate grasping the mucous membrane in a vaginal plastic, acetone for bathing a cancerous cervix, or it may be reserved for physiological saline for an intravenous infusion, a hypodermoclysis, or rectal feeling during operation.

Large quantities of fluid, above all if they are known to be septic should always be evacuated into a *deep* vessel to prevent undue splashing; the ordinary *pail* of agateware advantageously supplied with a wide, grooved nose-piece to facilitate emptying, is the best utensil for this purpose. Two such pails, one placed on each side of the operating table, are convenient for collecting the waste materials and serve to remind the surgeon and his assistants that soiled sponges and gauze should not be scattered promiscuously about the floor of the operating-room.

The bean-shaped *pus-basin* has retained its place as a useful article because its form makes it peculiarly adaptable to the varying curves of the body. The *pus-pan,* really a modified bed-pan, which can easily be pushed under the patient, and upon which any part of the body can rest without much discomfort, is designed especially to catch the pus and prevent avoidable soiling of the patient and the operating table. Its chief use, however, is in office and dispensary surgery, as when an abscess has to be opened in a location where the pus-basin is not practicable.

Nurses list of articles to be boiled in the utensil sterilizer:

1. The folding top of the operating and the supply tables.

2. Two small alcohol basins.

3. Six basins for sterile water.

4. Two large irrigating cans with tubes and nozzles.
5. Two pitchers.
6. Two pus-basins.
7. Three pails.

While the sterilization of operating-room *utensils* by boiling in alkaline water and their adaptation to this by the manufacturers is, strange as it may seem, of comparatively recent date, the routine sterilization of the *surgeon's instruments* by this method and the elimination of ornate hefts and designs which were difficult to keep clean marks the time when aseptic surgery really began. The sterilization of instruments by boiling is so easily accomplished that it required but little more than the proof of its unequalled reliability to win for it a permanent endorsement.

Boiling water is all that is needed. Almost any container can be used as a sterilizer; its shape or construction is only of secondary importance. The water is made slightly alkaline to prevent the rusting of the metal. For this end caustic soda, that is, sodium hydroxide (Na. O. H.) which can be obtained everywhere in the form of sticks containing about 90 per cent. of the water-free sodium hydroxide, is to be preferred. It is practically odorless and very convenient to handle. To a thousand parts of water *one* part of sodium hydroxide will generally suffice. Certainly in exceptional instances, as in the case of *rain water* which contains much organic matter and carbonic acid or is contaminated with sulphur as in some districts where soft coal is burned, as much as *ten* parts to the thousand—1 per cent.—may have to be allowed. Nothing is gained usually by increasing the alkalinity *beyond* the point necessary to prevent oxidation of the instruments. On the other hand, rubber goods bags, tubing—*in the event that this should be advantageous,* may be boiled along with the instruments with comparative impunity if the solution is not too strongly alkaline, while *very caustic* solutions would soon destroy them.

The *time* required to render instruments unquestionably aseptic varies with the nature of the contaminating organisms. Some of the ordinary pyogenic bacteria possess but little resistance and succumb quickly to the action of alkaline water at the boiling temperature. Five minutes may suffice to make these inert. It is the *spore-bearing* bacilli chiefly which complicates the problem of sterilization. The average time it takes to destroy most of these has been experimentally fixed. A representative member of the group is the tetanus bacillus. Not only do its spores possess the characteristic resistance to a pronounced degree but besides, they are developed rather rapidly, that is, at body temperature, often within 20 hours. From the behavior of these spores when subjected to the destructive action of thermic agents, the average time necessary for reliable sterilization in general, can be deduced. Reasoning on this basis it may be said that if a germ-laden instrument is boiled in alkalinized water for *fifteen minutes* its sterility is insured with reference to *all* the organisms which are commonly responsible for a wound infection. It scarcely needs to be added that this presupposes that the water is boiling actively during the entire specified time, that the instruments are all completely submerged, and that the sterilizer is covered to prevent undue lowering of the surface temperature of the boiling water.

Where *re*sterilization is regularly practised, as it should be, an *additional,* although strictly speaking, as far as the survival of spores is concerned, ordinarily a negligable safeguard is provided. Thus routine resterilization is advocated as a prophylactic measure to meet the demand of the *exceptional,* not of the usual case. An instrument that has recently been in contact with a case which is known to have developed a tetanus infection is not used after a single sterilization of 15 minutes because it is chiefly for these spore-bearing bacilli that resterilization may be of value. If such an instrument cannot be temporarily dispensed with on account of some unalterable emergency, the only alternative to supplant in a way, although imperfectly, the peculiar action of resterilization after a days interval, would be to *double* the length of the boiling time. In this connection it is also noteworthy that the spores of the tetanus bacillus are but slightly affected by the *drying* process which is otherwise so inimical to bacterial life. It is possible, for example, that an instrument may convey living tetanus spores to a wound, *two years* after its contamination. This view of the persistance of tetanus spore-life is also tenable in the case of the dust of the operating-room where the unfortunate patient has been treated.

The fact that almost any kind of receptable can fulfil the function of a sterilizer for surgical instruments is of especial moment when emergency surgery has to be done where proper facilities are wanting. But even in hospital practice the most serviceable instrument-sterilizers are of relatively simple construction. A useful device consists of a lever which is connected with a pedal at the base of the stand on which the sterilizer rests. If the pedal is depressed with the foot, the tray is lifted

out of the sterilizer-tank. This allows the boiling water to drain off and the instruments to become dry while the temperature falls sufficiently to permit handling and arranging them on the supply table.

While there is unanimity of opinion as to the proper sterilization of metallic instruments *in general*, in the case of *cutting* instruments, particularly scalpels, some surgeons have allowed a dangerous latitude. Surely it *cannot* be correct to be more lenient with the sterilization of a scalpel than with other instruments. Of all instruments it is the one that comes into the most intimate contact with the wound while inflicting it, and its absolute sterility must be beyond question. The only reason for this deviation seems to be *the fear of impairing materially the acumen of the cutting edge* when the knife is duly subjected to the boiling process. The question might as well be asked whether a dull blade should be preferred to a sharp one obtained at the risk of an imperfect asepsis. With the clear understanding that the *safety* of the patient who submits to an operation at the surgeon's hands is largely dependent upon the asepsis which is practised, and the asepsis in turn, on the sterility of the instruments, there can be no hesitation about the answer. Besides, although it is undoubted that the blade *can* be noticeably damaged by or during the boiling, it does not follow that this *must* necessarily be, if proper precautions are observed. Firstly, all scalpels ought to be boiled encased in a small knife-tray which, while allowing water to have free access, prevents the jostling of instruments against their sharp edges during the process of ebullition. Secondly, it is one of the remarkable properties of steel that it becomes very hard when heated to redness and suddenly plunged into cold water; if, however, it is heated to redness and left to cool gradually it becomes as soft as ordinary iron. But, also, changes in temperature much less marked, have a definite influence upon this susceptible metal. It is easy to understand how the steel of cutting instruments can be impaired when subjected for prolonged periods to the heat of boiling water which ordinarily is close to 100° C. and with 1 per cent. alkali may be as much as 104° C. If, as usually happens, the delicate blades are allowed to cool gradually, their temper must certainly diminish and the softened edges become dull with slight use. To obviate this, the cutting instruments, at, least the finer ones ought to be chilled by submersing them in cold alcohol immediately upon their removal from the sterilizer. All this is but another application of the lesson that nearly everyone of us has picked up in some village smithy where the steel is heated under the bellows to be forged and plunged into a bucket of water to restore its temper.

Finally, the after care of cutting instruments, particularly scalpels, is a weighty factor. A few strokes upon a good oilstone is all that is needed to bring back a blade that has been used at an operation, to its original condition. A *soft* oilstone acts rapidly and is in place when the blade is quite dull or when it is to be "ground down," as in case when the cutting edge has been damaged. A *harder* stone sharpens slowly but yields a finer edge and is therefore used for finishing. Glycerine diluted in alcohol is a good medium for use upon the stone in sharpening surgical instruments, and oil can advantageously be avoided.

It ought to be an inflexible rule of surgical cleanliness that no instrument which has been used at an operation, whether the case is known to be an unclean one or not, shall be returned to the instrument-closet without the proper sterilization and subsequent cleansing. At the same time, damaged instruments are laid aside for repair, cutting instruments which have lost their keen edge must be sharpened, and new suture materials supplied to replenish the deficit in the stock. Order should be cherished here, as in many things pertaining to the practice of surgery, not only by the nurse who has charge of the operating-room or office, but the surgeon himself as well, preëminently so, if he makes it a practice to operate in private institutions or homes or in the country and must occasionally rely entirely upon his own equipment.

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The next article will be "Aseptic Suture Material."

ANESTHESIA BY UNTRAINED ANESTHETISTS.

From a study of 2,400 anesthetic records, half of which were administered by untrained internes and the other half by an anesthetist or by internes trained for the work, the three following facts were obtained:

1. The untrained internes used over three times more ether. They averaged over three-fifths pounds an hour as against less than one-fifth pound an hour used by the anesthetist.

2. They stimulated six times as many patients during operation, using twenty times the number of stimulants in all.

3. They had 41 per cent. more post-operative vomiting and this lasted much longer, after continuing for a number of days.—EDITH WILLIAMS in *St. Louis Medical Review.*

THE SUBMUCOUS RESECTION OF THE NASAL SEPTUM: ITS INDICATIONS AND CONTRADICTIONS; ITS TECHNIC.

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The most important and conservative operation in the domain of rhinology is the submucous resection of the nasal septum. This operation seeks to conserve the mucous membrane of the nose and, where properly performed, it attains results which in the majority of cases are quite remarkable.

The earlier operations, such as the Asch and Roe procedures were destructive of a great deal of the ciliated epithelium of the nose. In many cases the results were good; in others the condition was as bad, if not worse, than before operation. Moreover, the post-operative treatment was painful and prolonged. Since Killian first described the "window resection," which afterward was modified by individual operators such as Freer, Ballenger, Yankauer and others, the older operation is seldom undertaken. I believe that the submucous resection has come to stay and that the general principle underlying the procedure will always remain, although each operator will use his own personal judgment as to special technic according to the individual case.

Indications. The chief indications for the operation will come under three headings:

1. Those cases where there is nasal obstruction.

2. Those cases where nasal breathing is not totally impaired but where there is a hypertrophic condition of the mucosa over the turbinates and where a conservative operation on the septum will relieve the pressure on the turbinates without sacrificing any of the tissue overlying them.

3. In those cases where indirect symptoms exist, such as a chronic catarrh of the ears, particularly with tinnitus; in cases of chronic pharyngitis and chronic laryngitis.

Where there is a distinct bend in the cartilage or bone sufficient to cause nasal obstruction, there can be no doubt of the need of operative interference. And it is remarkable to see the difference in the physical well-being of such patients after such an operation. I need but mention the case of a young man who gained 25 pounds in weight after such an operation; and another boy of 12 who grew over 10 inches in height within one year after operation.

Examination of the nose often reveals a slight deviation of the septum high up between the turbinates which by its sigmoid shape from before backwards causes obstruction to the intake of air by its close approximation to both middle turbinates. Even if the mucosa over these bones is hypertrophied, it is far better to correct the deviation than to sacrifice this tissue. The latter operation can be done later if necessary although the relief of the pressure makes such an enormous difference to the patient that further operation is seldom necessary.

In regard to the last indication, the judgment as to operation will depend a great deal on the individual treating the case. It is a wise rule to follow to do as little and as conservative operating in the nose as possible. However, there are certain cases, in which there is very little nasal obstruction but where indirect symptoms exist that fail to respond to medicinal treatment. In such cases, where even a slight deviation of the septum exists, a correction of this will often mean a complete cure. In this connection I recall one case of tinnitus in a woman of 30 who was completely cured of this distressing condition by a submucous resection where ordinary treatment had been of no avail. In this case, the deviation was so slight that it hardly interfered with breathing at all.[1]

Contraindications. These consist mainly of contraindications to any surgical operation, particularly diabetes, Bright's disease and hemophilia. It is inadvisable to operate upon a child unless nasal respiration is seriously interfered with, and particularly no operation should be attempted until complete bone formation has taken place. This usually occurs before the eighth year.

There are two classes of cases which should be carefully watched for some length of time before a submucous resection is performed. The first is in those patients in which a suppurative condition of the sinuses exists. Oftentimes a deviation of the septum has to be corrected before the diseased sinus can be properly observed. In such a case, the patient should be treated for a few weeks at least before the submucous resection is attempted.

The second class I refer to is that of young women, 18 or 19 years of age, thin, pale, anemic, with no resistance or excess vitality. The general physical condition of such a patient should be carefully built up before any operation is attempted; for if any infection should occur, and such a thing

(1) See Observations on the Pathologic Conditions of the Nose and Throat, with Special Reference to the Tubal Regions, Associated with Chronic Catarrhal Otitis Media. Harold Hays, *Annals of Otology, Rhinology and Laryngology.* June, 1910.

is particularly possible in the nose, it is a difficult matter to deal with it. It has been my misfortune to have two clinic cases develop septicemia after a submucous resection and one of these died.[2] And although few such complications are reported in the literature I have heard of many cases of infections after submucous resection and other operations within the nose. In the two cases I refer to (the only ones in over 200 submucous resections), the infection was particularly virulent. Such an accident is not as liable to happen in a case in private practice, particularly if the case is operated upon in a hospital under strict aseptic precautions.

THE TECHNIC OF THE OPERATION.

The nose should be thoroughly cleansed with alkaline solutions and the mucosa thoroughly sprayed with 1-1000 adrenalin so as to constrict the capillaries before cocaine is applied. By doing this, toxic effects from the cocaine will seldom occur. The mucosa is then anesthetized by applying pledgets of cotton saturated with a 10 per cent. cocaine solution in 1-1000 adrenalin. These pledgets are left in place 20 minutes, removed and the entire mucosa swabbed with cocaine crystals until there is absolutely no sensation. The entire septum is then applicated with pure tincture of iodine, one being careful to get far enough back and well up between the middle turbinates. I have never seen any ill effects from the use of this solution and it will go well toward eliminating a possible infection.[3]

An incision is made in the anterior portion of the cartilaginous septum on the convex side, this incision being made perpendicularly as high up and as far down as possible and it should be carried through the periosteum. The periosteum is then elevated on this side with a suitable elevator, particular care being taken to separate the two layers overlying the maxillary crest. An incision is then made through the cartilage with an elevator or dulled knife or curette but on no account should this incision go through the mucoperichondrium of the opposite side. This membrane is carefully separated through the opening thus made and the cartilage and bone removed by means of suitable bone-breaking forceps. I have recently had one constructed by Pfau, of Berlin, which, on account of its narrow blades, answers the purpose admirably.

The chief difficulty one will encounter is in removing the maxillary crest. Here the bone is dense and the periosteum very adherent. As a rule it can be removed by down-cutting forceps (McCoy) or chisels (Killian).

When the operation is completed the flaps of mucoperiosteum should hang perfectly straight and away from the turbinates. The edges of the incision should approximate. No suture is needed; in fact, I believe suturing tends toward infection. After the edges of the incision are brought together, both nares are packed with strips of bismuth subnitrate gauze which should remain in place at least 24 hours.[4] I have had this especially prepared and find that it is much better than iodoform. Its removal is readily accomplished by saturating it with liquid albolene, dropped slowly into the nose until the gauze separates from the surrounding parts.

The after-treatment is very simple. The nose is sprayed with 50 per cent. peroxide of hydrogen for two days and this is followed by the following spray, used every two hours:

℞

Adrenalin (1-1000) 3ii
Dobell's sol. .....ʒi
Physiologic salt. sol. q. s. ad...ʒii

At the end of a week, the spray is changed to some oily solution. At the end of two weeks, the nose should be perfectly clean and all inflammation should have subsided.

I operate many of my cases of submucous resection in the hospital and *all of them* on the operating table in the recumbent position with the head slightly raised. This position is far easier for the patient than sitting up in the chair, as there is less tendency to fainting. It is slightly harder for the operator, but it well repays one for the trouble.

The shock to the system from a submucous resection is far greater than is generally supposed, and to my mind it is absolutely wrong to allow these patients to attend to their usual duties for the first four or five days after operation. Rest in bed is not imperative but it helps a great deal in the convalescence. The immediate post-operative distress is overcome by giving the patient a quarter of a grain of morphine before operation and by administering ten grains of veronal with one-half a grain of codein, in warm milk the same evening.

(2) Septicemia Following the Submucous Resection of the Nasal Septum. Harold Hays, *American Journal of Surgery*. October, 1909.

(3) The method here mentioned is described in detail in my two former papers.

a. The McCoy Instruments in the Submucous Resection of the Nasal Septum, *Kansas Index Lancet*. July, 1909.

b. The Technic of the Submucous Resection, *American Medicine*. May, 1909.

(4) Bismuth Subnitrate Gauze for Use in the Nose, Harold Hays, *Journal of the A. M. A.* January 22, 1910

Ice-cloths may be applied to the bridge of the nose and forehead to allay the inflammation and distressed feeling.

11 WEST EIGHTY-FIRST STREET.

ILEO-ILEOCOLIC INTUSSUSCEPTION DUE TO ADENOMA OF THE ILEUM, IN A CHILD FIVE YEARS OF AGE; RESECTION OF 12 INCHES OF GANGRENOUS INTESTINE; RECOVERY.

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The most important consideration in the treatment of intussusception is its early diagnosis. The prognosis depends upon prompt measures, usually operative. The prospects of recovery improve in direct ratio with the time of the institution of treatment after the onset of symptoms.

The history and symptoms are characteristic. The presence of a tumor, blood and mucous stools and rectal tenesmus are the important factors which make this form of intestinal obstructions most readily diagnosed. The attacks are sudden and are characterized by severe pain and pallor followed by a period of apparent well being, until symptoms of collapse or sepsis set in.

Notwithstanding these characteristic symptoms, intussusception, especially in children, is frequently treated for a gastroenteritis or spoiled stomach. As it is possible to recognize intestinal invagination early, such cases should be seen by a surgeon, so that operative measures can be instituted at once. The responsibility for the failure of a successful outcome in many cases rests, therefore, upon the laity as well as the attending physician.

Of the many causes which play an important rôle in the production of intussusception, may be mentioned irregular muscular contraction, increased peristalsis, increased irritability, differences in the diameter of ileum and cecum, benign and malignant tumors, the last are least common.

Wharton (*Annals of Surgery*, September, 1911) says that, "Benign tumors of the intestine provocative of an intusssusception are rare." He also states "The etiological influence of tumor in the production of intusssusception, seems to be restricted entirely to adult life."

In view of these statements, it is of interest to record a case of a rather rare form of intussusception occurring in a child five years of age in whom the etiological factor in the production of the intestinal invagination was an adenoma, which was found situated in the wall of the small intestine at the apex of the intussusceptum.

The several features which make the report of this case justifiable are: 1st, the rare form of intussusception; 2d, the length of time the condition existed before operation; 3d, the successful outcome after resection of over twelve inches of gangrenous bowel, in so young a child; 4th, the existence of a benign tumor springing from the wall of the ileum and affixed to the apex of the intussusceptum.

Della G., aged five years, who had always enjoyed good health, was admitted to the Lebanon Hospital, on April 27, 1911, in the service of Dr. Parker Syms, with the following history: Two days before, on April 25, while in school, she was seized with severe abdominal pain and vomiting. The paroxysm quickly passed away, but it recurred at frequent intervals. On medical advice, the child was given a dose of castor oil, which was followed that night by a bloody stool. On admission, April 27, the child did not appear acutely ill, although her temperture was 103.2°, pulse 144 and respirations 27. The heart and lungs were negative; the abdomen was slightly distended, not rigid; a distinct mass was felt in the right lower half of the abdomen; there was slight tenderness over the mass.

From the history and physical signs, a diagnosis of intussusception of more than 48 hours standing was made and immediate operation was advised.

Operation.—I made a three-inch incision through the right rectus muscle and peritoneum. On opening the peritoneum, a small amount of foul-smelling fluid escaped. Exploration revealed a mass in the ileo-cecal region. On delivering this outside the abdominal cavity, the tumor was found to be an ileo-ileocolic (ileaca-ileocolica) intussusception, that is, an enteric intussusception which had passed through the ileo-cecal valve and formed an elongated tumor in the cecum. The cecal valve was not invaginated. After reducing, with quite some difficulty, the intussusceptum out through the ileo-cecal valve by gentle manipulation, there still existed an enteric intussusception, which had started at quite some distance from the ileo-cecal valve. Within the ileum a small tumor was felt which made it extremely difficult to reduce. The enteric intussusception was finally disinvaginated by gentle milking and traction with the discharge of quite some little fluid of a foul odor.

About 12 inches of ileum was lusterless and gangrenous, with part of its serous coat torn. A little more than 12 inches of gut were excised, an end-to-end anastomosis was made by means of a Murphy button, reinforced by Lembert sutures, and the mesentery was sutured. A cigarette drain was

placed down to the site of anastomosis and the abdominal wound was closed by the layer method .

Outside of a small sinus, which closed a few days after the drain was removed, the patient did well. The button was passed on the ninth day after operation, and the patient was discharged from the hospital on May 21, a little over three weeks after the operation, absolutely cured. The excised gut contained a submucous nodular mass (adenoma) about the size of a large hazelnut which was affixed to the apex of the intussusception and probably was the etiological factor in the production of this rare condition.

According to the literature, ileaca-ileocolica or ileo-ileocolic intussusception, has not been frequently observed, and adenomas of the intestine are rare, and as an etiological factor in the production of intestinal invagination they are still rarer.

In view of the pathological findings the case therefore seems rather unique and worthy of recording.

ON THE USEFULNESS OF SPECIAL CONTAINERS FOR PROCTOCLYSIS.

CHARLES SCOTT VENABLE, M.D.,
Surgeon-in-Charge "Lee Surgical Hospital,"
SAN ANTONIO, TEXAS.

A little over a year ago, at a meeting of the Texas Medical Association at Dallas, I gave voice to what was considered a heresy, in the statement that it was not only useless, but foolish, to attempt to maintain any uniform temperature of the fluid in the container in practicing proctoclysis. Do not understand me to decry proctoclysis, for I consider it of inestimable value in post-operative treatment; and I order it as a routine for "clean" as well as septic cases. Its introduction was one of the greatest achievements of a great man.

Two years ago, believing this to be true, I demonstrated to my own satisfaction, that water passing from a container through five feet of tubing at the rate of 40 drops a minute must be 206° F. in the container to be 98° F. as it dripped from the distal end of the tube. This, any one can demonstrate with a basin of water and a tube with an irrigating thermometer in the end. And again, ice water, 36° F., regulated in the same manner is equally influenced by atmospheric conditions and is approximately at room temperature at the drip! In other words there is sufficient stasis in the water in the tube to permit of its being cooled to surrounding air temperature.

My next experiment was to coil a catheter in the rectum of a dog, leaving the outlet just outside the anus: and I found that the temperature at the "drip" was uniformly 0.2° less than body temperature, whether water at 206°, 81° or 36° had been placed in the container. I then selected eight patients as control with varying body temperatures, with the same result. It would therefore appear that the fluid in passing at the rate of 40 drops to the minute through the 6 or 8 inches of tube in the rectum then attains body temperature and is ready for absorption at the point of discharge into the rectum, and is not dependent on any temperature given it in the container, whatever the device or design, and whether operated by gas, gasoline, electricity or thermos bottle.

Since then, September, 1909, it has been my routine to have the salt solution, or whatever fluid I have ordered for proctoclysis, placed in the container at "room" temperature, to be administered continuously for four hours and discontinued two hours alternately. Complain from the patient, or non-retention are unknown quantities, unless the drip has been imperfectly regulated by the nurse, and when this was corrected it uniformly overcame the difficulty.

In these two years proctoclysis has been administered in this manner to over 600 patients, in which service of unselected cases there has been a mortality of less than 3 per cent.; which would seem to show that whatever is due proctoclysis in lessening our mortality, is credited and is borne out clinically by the end result of this technic.

Letters to the Editor

Charleston-Kanawha, W. Va., October 5, 1911.

To the Editor, AMERICAN JOURNAL OF SURGERY:

I notice an editorial in the AMERICAN JOURNAL OF SURGERY, September, 1911, on the subject of skin disinfection. I wish to say that while the article of Grossich in the *Zentralblatt für Chirurgie*, October, 1908, is usually said to be the first recorded use of iodin for this purpose, I began using the tincture of iodin for this purpose in 1905, and published my method in the *Journal of the A. M. A.* April 14, 1906, page 1102. I also described my method in *American Medicine*, November, 1906, in the *Therapeutic Gazette*, May 15, 1907, and in the *Journal of the A. M. A.*, May 11, 1907.

I was in Munich in the fall of 1907, and noticed that Döderlein was using iodin as a skin disinfectant regularly in his clinics.

Very truly yours,

J. E. CANNADAY.

American Journal of Surgery

PUBLISHED BY THE

SURGERY PUBLISHING CO.

J. MacDONALD, Jr., M.D., President and Treasurer

92 William St., N. Y., U. S. A.

to whom all communications intended for the Editor, original articles, books for review, exchanges, business letters and subscriptions should be addressed.

SUBSCRIPTION PRICE, ONE DOLLAR
FOREIGN, SIX SHILLINGS

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WALTER M. BRICKNER, M.D., Editor

NEW YORK, NOVEMBER, 1911.

DEVELOPMENTS IN RADIOGRAPHIC DIAGNOSES OF THE HOLLOW VISCERA.

Only the osseous and dental, of the normal animal tissues, possess sufficient opacity to the *x*-rays to be studied *pictorially* on the radiogram, and thus the early Roentgen pictures portrayed only skeletal structures. In the thorax the denser structures—the heart, the blood-filled aortic arch—are opaque relatively to the surrounding air-distended lung tissue, and so the heart and the normal and diseased aorta, deposits and cavities in the lungs, and fluid and air in the pleural spaces came soon within the sphere of radiography, as outline studies only, however. Similarly an occasional brain tumor came to be recognized in silhouette; and conversely, but later and with much greater accuracy, the cranial air sinuses yielded their secrets to *x*-ray study.

Meanwhile, pathological tissues of bony opacity acquired great interest to radiographists, and the *x*-ray diagnosis of urinary calculi was developed in a few years to a point of great accuracy—one of the most significant accomplishments of modern medical resource.

The outlines of the kidneys can be limned, often only faintly, by the expert radiographist; the psoas muscles—and many muscles of the extremities—can be shadowed; so can the liver and spleen in small children; gas-filled areas in the bowels are shown on the picture by contrast with the surrounding shadow—but these are the limits of unaided visceral radiography below the diaphragm.

To further study the hollow organs and abnormal spaces in the body artificial aids, opaque to the Roentgen ray, were called in. We are becoming quite accustomed to demonstrating skiagraphically the paths of the ureters by means of opaque or stiletted catheters, and to studying the outlines of the kidney pelves by injecting collargol suspension, argyrol solution, etc.

Of the various metallic salts thus employed radiographically bismuth has been the most acceptable. Thus, it was early used in tracing sinuses, and in studying the terminal bloodvessels by injection into the arteries of cadaveric tissues. But the most interesting and useful field for bismuth emulsions and capsules in *x*-ray studies has been the digestive tract. Its employment in the diagnosis of stricture and diverticulum of the esophagus was a comparatively easy accomplishment. It is of the stomach and intestines that bismuth radiography is now the absorbing study—presenting as it does so many technical difficulties and involving so many unsolved physiological data.

The earlier experiments of Cannon (1904) taught certain important facts in the movements of the bowels during digestion and at the same time established the value of bismuth radiography for further study. The moving *x*-ray picture was the next development in the study of the mechanical processes of digestion, and cinematographic silhouettes of your gastric peristalsis can be thrown on a screen with an effect that is startling, even weird!

The study of the outlines and movements of the healthy stomach and bowels led to the recognition of certain variations from the usual that were distinctly abnormal, and in many instances these variations could be correctly interpreted. Thus, a marked concavity interrupting the shadow of the convex border of the greater curvature of the stomach indicated the presence there of a tumor, and similarly adhesions between the pylorus and the gall-bladder obstruction of the pylorus, etc., were interpretable from the shadow of the bismuth-fed stomach. Steady progress in this special field of diagnosis is being made by many workers abroad and by several in this country, notably Leonard, Pfahler and Coles. But the work is still only experimental, and its results are thus far dependent very largely on the interpretations of the individual radiographists, since even the positions of the stomach in health have not yet been quite definitely established.

That we have not yet reached a point in which radiography of the stomach and bowels has a specific and definite diagnostic value makes especially interesting the recent article by Harry Adler and H. E. Ashbury in the *N. Y. Medical Journal*, October 7, 1911 (abstracted at considerable length on page 369 of this issue), in which they report what appears to be a truly remarkable success in demonstrating gastric ulcers by the *x*-ray. Their method depends on the fact, they say, that the ulcerated surfaces detain bismuth for a considerable period after it has left the surrounding normal mucosa; and so they make their exposures at a time when the bismuth emulsion will have passed from the stomach into the bowel. Their large percentage of correct diagnoses and their small percentage of errors—as determined by subsequent operations or autopsies—are quite impressive. If further experience shows that gastric ulcers can indeed be made to cast unmistakable shadows on the *x*-ray plate, there will have been established a specific diagnostic method of very great value and importance.—W. M. B.

THE COLORING OF FISTULOUS TRACTS TO FACILITATE EXCISIONS.

That unsatisfactory results in operations for fistula, notably those about the anus, are so often due to failure to open or to excise, because unseen, some branch or ramification of the tract, led us some time ago to call attention in these columns (as a "Surgical Suggestion") to the value of injecting a staining solution into a fistula in ano just before incising it.

The recent article by Slawinski (*Zentralblatt für Chirurgie*, September 16, 1911), also recommending this procedure, encourages us to refer again to a device that is so satisfactory in results and so simple in execution.

One may use, according to the case or to his own inclination, a thin vaseline paste colored by, or an aqueous solution of, any convenient dye (Slawinski employs a saturated solution of methylene blue, but the strength of the solution is not important). For the injection of the solution an ordinary hypodermatic syringe will suffice, but a blunt tipped needle (as of a lacrimal syringe) obviates the chance of forcing the dye into the surrounding tissues instead of into the sinus. If the fistula is complete it is desirable to press a finger over its inner extremity to avoid flooding the rectum. The only other precaution needed is gentle and slow injection, lest overflow from the fistula spread itself on the patient's buttocks and the operator's hand.

With every ramification of the tract clearly demonstrated by the dye, the surgeon will more often find himself excising pararectal and anal fistula instead of merely incising them. Excision under these conditions is usually not difficult and, as compared with simple division or division and curettage, it secures healing more surely and more quickly, whether the wound be merely packed or whether it be (as it sometimes may well be) partly or entirely closed by suture.—W. M.. B.

Surgical Suggestions

Tuberculosis of the bones develops in the epiphyses or the joint synovia. An inflammatory lesion in the shaft of a long bone is never tuberculous.

The sooner a long bone is opened in acute osteomyelitis the less the destruction.

The *x*-ray is invaluable in the diagnosis of bone cortex and periosteal disease. In bone medulla infections it is of little service.

No chronic bone swelling should be subjected to operation without excluding syphilis.

Scrutinize carefully every "fistula" near the anus; a skin-lined sinus in the median line, in front of or behind the anus, is congenital and usually leads to a small dermoid.

A troublesome "erosion" of the cervix may disappear without any other treatment than the replacement by pessary of a coexistent retroflexion.

Uterine curettage has its chief indications in incomplete abortion, metrorrhagia as from submucous fibroids, inoperable carcinoma, etc. Its indiscriminate employment in chronic endometritis is to be condemned.

Chronic tenosynovitis at the wrist may be differentiated from other swellings (*e. g.*, lipoma) by fulness and fluctuation in the palm when the prominent area is pressed upon.

The removal of a wedge of skin at the side of an ingrown nail, as in Cotting's operation, is rarely necessary and usually objectionable. Granulations disappear quickly when the nail segment is withdrawn; if they are exuberant they may be snipped or burned off.

Surgical Sociology

Ira S. Wile, M.D.
Department Editor

In the category of diseases there are few that may be regarded as essentially surgical from their earliest inception. Cancer represents a disease belonging principally to the domain of surgery.

Despite the improvements in diagnostic technic, in spite of the increase in hospital and dispensary facilities for the detection of incipient carcinoma, regardless of the intelligent principle of securing early operations, vital statistics reveal a striking increase in the mortality from this disease. Since 1880 the death rate from cancer in seventeen states has risen from 3.61 per 10,000 population to 7.35. The rate for the registration area rose from 74.3 in 1908 to 77.0 in 1909, while the average rate from this cause during the period 1901 to 1905 was 68.3.

It is exceedingly striking that the increase in the incidence of cancer does not involve merely the deeper viscera where the difficulties of diagnosis are heightened, but also affects the carcinomata that are localized superficially. Cancer of the mouth increased from 2.1 for the period 1901 to 1905 to 2.9 during 1909, and cancer of the skin showed a mortality rate that rose from 2.3 as the average from 1901 to 1905 to 3.1 in 1909.

The usual assignment of cancer to the diseases of old age often beclouds the fact that cancer may occur at any age from infancy to senility. Gastric cancer has been reported by Riegel as occurring in a six weeks' old infant. In New York City during 1900 there were six deaths from cancer recorded between the ages of five and ten years; four between ten and fifteen years; and six between fifteen and twenty years. Practically 10% of the deaths from cancer occur below the age of forty years.

Cancer mortality is increasing in every decade of life. Between 1880 and 1907 there was a 10% increase in the death rate from cancer below twenty years. During the same period, however, there was a 94% increase in the rate for the decade from fifty to sixty years. The ratio of increase in the cancer mortality rate is greatest after fifty years.

According to the census 62% of cancer deaths occur among females as compared with 38% among males. This striking difference is largely due to the frequency of cancers of the uterus and of the breast. According to the Registrar-General of England, one woman out of every nine alive at the age of thirty-five years will die from cancer. The relation of occupation to cancer has been the subject of much discussion since Virchow first called attention to the frequency of lip cancers among pipe smokers and to the numerous examples of scrotal cancers among chimney sweeps. A careful survey of the available figures fails to show any definite interrelation of cancer and occupations.

It is noteworthy that the increase in the mortality from cancer is greater in urban than in rural communities, though it is impossible to adduce any reason for this statistical phenomenon.

While there is a recognized prevalence of tuberculosis among the colored races, the mortality from cancer among the negroes is only about one-half that found among the whites in the same communities north or south of the Mason and Dixon line.

Too much stress has been placed upon the problematical effect of heredity in the incidence of cancer. The disease is so common that there are few families who will not upon investigation reveal the fact that some member thereof died from this cause.

The increase in the death rate from cancer is real and not merely apparent because of the greater number of persons whose lives have been spared sufficiently long to enable them to live to the decades when this disease is most prevalent. The ratio of increase of the death rate from cancer is greater than the ratio of increase of population.

For many years a war has been waged by all the social forces against the high death rate from tuberculosis. During 1909 cancer caused 45% as many deaths as tuberculosis, and as yet no organized effort has been made to combat this horrible disease. The Crocker fund in New York is available to study the disease and if possible find a means of overcoming it. The International Association for Cancer Research bears witness to the desire of scientists to ascertain the methods of development of the disease. The New York State Cancer Laboratory has long been at work upon the problem. But progress has been discouragingly slow.

The transplantation of cancers among some of the small animals has given rise to the view that there may be an infectious factor in the etiology of the disease. This view was taken by the German Cancer Commission, inasmuch as in about 14% of a large number of cancer cases the parents were found to have suffered from a similar disease. Some interesting observations were made by Behla, who reported nineteen cases of apparent infection of husbands by cancerous wives. Budd, Gueillot, and various others give evidence of a similar nature, all going to suggest that infection of some sort is at the basis of the etiology of the disease.

The main social features at present involved in a consideration of this serious disease group themselves around the proper care of the sufferers and the means of lessening the mortality rate. First, it is regrettable that there is insufficient hospital space available for the chronic sufferer before whose death there is a long period of painful invalidism that lowers the home standards of the families in which the disease occurs, owing to the constant drain upon the purse, and the long continued period of helplessness requiring nursing attention that robs the family of health and strength. With an unavoidable death impending it appears to be a sad fate for the entire household to be dragged down nearer the grave. Early diagnosis in the hospitals and dispensaries is imperative, and the public must be enlightened on the necessity of early

surgical intervention as soon as the diagnosis is made. It is advisable to give the patient the benefit of the doubt and even insist upon an exploratory operation rather than to delay the diagnosis a long period of time through a hopefulness that the lesion may not be malignant. Metastasis means mortality. Cachexia is a shadow of the death to come.

The removal of pigmented moles, the excision of every tumor in the mammary area, the study of uterine scrapings, the prompt interference in any case of metrorrhagia, particularly at the menopause, the pathological examination of tissues from ulcerated areas around the tongue, lips, anus, or cervix, all suggest methods that may be of value in the mammoth task of lessening the mortality of the disease.

Constructive measures for the prevention of cancer are difficult to suggest until there are more facts forthcoming to determine the etiology of the condition. It is evident that if trauma be a factor in the causation of cancer it is important to obviate those kinds of traumata that have been regarded as favoring the development of the carcinomatous lesions. If an infective agent is responsible there must be a concentrated attack upon the trail of the offending micro-organism until its nature is definitely ascertained.

As a disease that is apparently increasing beyond the efforts of the surgical profession to limit its deadly nature, cancer demands especial attention in the interests of humanity. There should be established a clearing house for the dissemination of information regarding carcinomata. Every hospital should afford opportunities for pathological examination of all suspicious tissues. County hospitals or city hospitals should afford the general practitioners abundant chance to secure diagnoses based upon microscopical findings. Many municipalities maintain large laboratories devoted to research, a part of the space of which might well be devoted to the investigation of the numerous problems that are related to malignant growths.

After the scientist has blazed the trail, it will be an easy matter for the general profession to follow in his footsteps. The true scientist is manifestly a real social worker.

THE DOCTOR IN POLITICS.

"The doctor in politics" is urging legislation for the betterment of mankind, while his timid brother is complaining of the sins and shortcomings of his competitor. He was the chief factor in raising the standard of medical education by legislative enactment, the pure food and drugs laws, the quarantine and sanitary laws. He is always on the affirmative side of moral questions, his influence being all powerful. He is known far beyond the confines of his practice and neighborhood.—W. H. STEMM in *Journal of the Indiana State Medical Association.*

Book Reviews

One Hundred Surgical Problems. The Experiences of Daily Practice Dissected and Explained. By JAMES G. MUMFORD, M.D., Visiting Surgeon to the Massachusetts General Hospital; Instructor in Surgery, Harvard Medical School, etc., etc. Octavo; 354 pages. Boston: W. M. LEONARD, 1911.

This book is one of "the case history series" by different authors. The method of teaching clinical medicine is surely a most attractive and efficient one, yet has been neglected in recent years. It is, therefore, a pleasure to see an effort at a revival of the method so brilliantly practised by the old masters in medicine. On the whole, Mumford has done his work well, combining bedside observation, general surgical information and personal opinion and experience in a very readable and instructive manner.

The case histories dealing with digestive disorders appeal to us as being the most attractive and interesting in the work. We must deplore the lack of orderliness in the grouping of diseases as well as the choice of titles for some of the chapters. In the chapter on dyspepsia is a straightforward case of perforated duodenal ulcer. One of the chapters is called "seizures" when the author may have termed it "reflex epilepsy," because he seemed to consider his cases of such a nature. One case (case 13: sterility) was described apparently for the sole purpose of pointing out that a mother-in-law may be "masterful, bearded, strident."

Although Mumford usually brings out the important facts in his cases in bold relief, we sometimes find significant features lost among less important details. The latter is illustrated in case 33, a patient who suffered from "an acute renal infection of hematogenous origin." The author states, in passing, that the patient has "a slight endocarditis." He makes no further reference to this fact although he found one kidney the seat of a number of areas of softening and " a number of small injected areas, evidently infarcts." The patient developed a pneumonia on the fourth day after operation and died several days later. Certainly the possibility of the case being one of acute endocarditis, with multiple septic emboli, should have been indicated.

Despite these minor criticisms the book will be found very interesting and instructive, well prepared by the publisher, and containing a number of handsome plates of bismuth radiograms of abnormalities of the colon.

La Pratique des Maladies des Enfants. *Vol. VII. Chirurgie des Enfants.* By BROCA, FROELICH, MOUCHET, GUISEZ and TERRIEN. Octavo; 540 pages; 235 illustrations. Paris: J. B. BAILLIERE ET FILS, 1911. Price $2.80, in paper cover.

In keeping with the other seven volumes of this system of pediatrics the surgeons who have been most prominent in the field of surgery of children in France have been selected for this volume. The object of this new system has been to place a practical and comprehensive series before the physician; and the authors have surely succeeded in doing so in the volume on surgery. Froelich's share in the surgery of the digestive cardio-vascular and pulmonary system; Broca and Mouchet, genito-urinary surgery; diseases of the larynx, nose and ear, by Guisez; diseases of the eye, by Terrien.

The subject grouping is admirably uniform and clear throughout the different sections of the work. The authors devote most of their space to diagnosis and general therapeusis, so that one finds but brief descriptions of operative procedures that leave much to be desired in respect to detail and lucidity. Although no attempt at bibliographical fulness has been made, we believe that the value of the book would be greatly enhanced if epoch-making surgeons and their work were more directly alluded to. We note that scant mention is made of the non-French surgeons; for example, in the section on cleft-palate (page

30) the author refers very briefly to the Brophy operation and does not even speak of the splendid work of the English surgeons in this field.

The simplicity of style and clarity of text that are maintained through this work are noteworthy features. It may be that the effort in this direction has been the cause of the occasional omission of important facts. Thus, in the description of dermoid cysts of the face (page 39) no mention is made of the very thin septum that is not infrequently the only structure lying between an orbital dermoid cyst and the meninges. Noma is not described in the section devoted to gangrenous inflammation of the vulva (page 251). Gonorrheal inflammation receives but passing notice in a long chapter upon catarrhal conjunctivitis (page 372).

Many of the illustrations enhance the value of the text, yet, as a whole, this department of the book leaves much to be desired. Some of the photographs are vague and blurred (that on page 66, for example), and some of the drawings are far from artistic or true to life, *e. g.*, that on page 109. Despite these criticisms we believe that the volume will appeal to the wide circle of physicians interested in the surgery of childhood.

Books Received

The Blood and Its Third Anatomical Element. Application of the Microzymian Theory of the living organization to the study of the anatomical and chemical constitution of the blood and to that of the anatomical and physiological causes of the phenomena of its coagulation and of its other spontaneous changes. By A. BECHAMP, formerly Professor in the Medical Faculty of the Montpelier (France), corresponding member of the Academy of Medicine, etc. Translated from the French by MONTAGUE R. LEVERSON, M.D., of the Baltimore Medical School and M.A. and Ph.D. of the University of Göttingen. Duodecimo; 438 pages. Philadelphia: BOERICKE & TAFEL, 1911. $1.50. Postage, 10 cents.

Hieronymus Fracastor's Syphilis from the original Latin. A translation in prose of Fracastor's immortal poem. Octavo; 58 pages. St. Louis, Mo.: THE PHILMAR COMPANY.

The House Fly—Disease Carrier. An Account of its Dangerous Activities and of the Means of Destroying It. By L. O. HOWARD, Ph.D. Small octavo; 312 pages; illustrated. New York: FREDERICK A. STOKES Co., 1911.

Year Book of the Pilcher Hospital, Brooklyn, for the period from March 16, 1910, to March 31, 1911. LEWIS S., PAUL M. and JAMES T. PILCHER, Staff of the Hospital.

Practical Cystoscopy and the Diagnosis of Surgical Diseases of the Kidneys and Urinary Bladder. By PAUL M. PILCHER, M.D., Consulting Surgeon to the Eastern Long Island Hospital. Octavo of 398 pages, with 233 illustrations, 29 in colors. Philadelphia and London: W. B. SAUNDERS Co., 1911. Cloth, $5.50, net.

Manual of Pathology, including Bacteriology, The Technic of Post-Mortems, and Methods of Pathologic Research. By W. M. LATE CORLIN, M.D., Professor of Pathology, Jefferson Medical College, Philadelphia; Medical Director of the Jefferson Medical College Hospital; Pathologist to Jefferson Medical College Hospital and to the Philadelphia (Blockley) Hospital, etc. *Fifth Edition,* Rewritten and Enlarged. Octavo; 1139 pages; 612 illustrations, and twelve plates. Philadelphia: P. BLAKISTON'S SON & Co., 1911. $4.50.

Vaccine Therapy in General Practice. By GEORGE H. SHERMAN, M.D. Duodecimo; 142 pages. Detroit, Michigan. PUBLISHED FOR THE AUTHOR, 1911.

Progress in Surgery

A Résumé of Recent Literature.

Further Experience in X-Ray Diagnosis of Ulcer of the Stomach and Duodenum, Embracing Seventy-five Cases. HARRY ADLER and HOWARD E. ASHBURY, Baltimore. *N. Y. Medical Journal,* October 7, 1911.

The principle of this method of demonstrating ulcers by the *x*-ray is based upon the fact that the crater of an ulcer will retain a salt of bismuth after the normal mucosa has been cleared of it by the peristaltic action of the stomach and intestine.

The method consists in making several skiagraphs of the patient's stomach at definite periods, after the administration of known quantities of one of the harmless salts of bismuth (preferably the subcarbonate).

1. *The preparation of the patient.*—A laxative is advisable twenty-four hours before the examination, at which time light or liquid diet should be ordered; twelve hours before the first bismuth is taken all food and liquids are restricted by mouth, then ninety grains of the subcarbonate of bismuth is given in two ounces of water.

2. *The first skiagraph* is taken within from four to six hours thereafter, this interval representing the normal clearance—time for a normal stomach to empty itself.

3. *Second skiagraph.*—As soon as the first plate is known to be satisfactory, the patient is given a mixture containing

℞ Bismuth subcarbonate ..... } of each ℥iss
Powdered acacia..... }
Pepperment water .....℥ii
Water .....q. s. ad ℥xvj

and the second exposure is made.

4. *The development* should be carried to a point where all the detail possible can be obtained, trying to prevent, as much as possible, the minor defects in the film which may be right at ulcer shadow. It is often wise to make duplicate plates of each.

Under normal conditions the stomach will clear itself of ninety grains of bismuth within four hours, and the bismuth retained at the site of an ulcer will remain there two hours.

In numbers of normal stomachs and cases with marked gastroptosis, the clearance time has always been less than four hours. In carefully prepared patients the first dose is found in the cecum, the intestine being entirely free of bismuth.

From these observations one can feel reasonably safe in assuming that any bismuth which remains in the stomach after the normal clearance time is held there by some pathological condition which interferes with normal peristalsis or holds the bismuth by the presence of some agglutinant substance which prevents the elimination of the bismuth, or by some permanent obstruction to its outlet. In the duodenum, adhesions and dilatation, or relaxation at the site of the ulcer plays an important part in its retention. Ulcerations in the fixed portion of the duodenum are more easily detected than in the freely movable portion.

The plates are best viewed when placed side by side on a large window facing the northern sky, or in a Wheatstone stereoscope illuminator. The first plate, being the most important, is viewed first, and note is made of any isolated spots of bismuth. If, by comparison with the second plate, an isolated spot is detected in the stomach area, this should be noted as suspicious of ulcer of the stomach; if outside of the stomach area, in the course of the duodenum, as a duodenal ulcer. The character of the ulcer shadow is usually thin, irregular in outline, but circumscribed. There may be more than one. If much of the dose is retained the shadow is larger, generally located at the pylorus, and the bismuth is not seen in the cæcum. This would point to an obstruction. In such a case it is difficult to say from the skiagraph whether an ulcer is present or not, but the stomach outline in the second plate usually serves as an aid by throwing light on the true

condition. The size of the ulcer may be approximated from the amount of bismuth retained at its site; the deeper it is, the larger quantity of bismuth it will retain and consequently a denser shadow will be seen. In the case of very superficial ulcers the shadow is usually thin and may often have to be verified by repeated examinations at a shorter interval than the first.

The possibility of error due to incorrect interpretation is slight where the preparation of the patient is thorough, and the interval between the first dose of bismuth and the first plate has been carefully timed.

The authors record their results under the following heads:

1. Ulcer diagnosticated by *x*-ray.

Group a—Cases verified by operation (seven cases).

Group b—Cases substantiated by presence of cardinal symptoms of hemorrhage, pain and localized tenderness (seventeen cases).

2. Cases submitted for *x*-ray examination in which the findings were negative.

Group a—Negative findings substantiated by operations (twelve cases).

b—Negative findings substantiated by later clinical history (twenty-nine cases).

c—Negative findings substantiated by autopsy (two cases).

d—Negative findings unsubstantiated (six cases).

3. Cases in which *x*-ray diagnosis was incorrect (two cases).

a—Ulcer not detected by *x*-ray.

b—Ulcer diagnosticated by *x*-ray. Operation showed gallstones.

4. Cases clinically ulcer in which *x*-ray findings were negative (two cases).

a—*X*-ray examination made two weeks after instituting Lenhartz treatment.

b—Clinically duodenal ulcer.

Some Apparently Obscure Conditions of the Gastro-Intestinal Tract and the Practical Application of the Röntgen Ray in Their Diagnosis. G. R. SATTERLEE and L. T. LEWALD, New York. *Journal A. M. A.*, October 14, 1911.

Satterlee & Lewald find that the length of time taken by the contents of the gastro-intestinal tract to reach each division of the tract to leave it empty can be definiely determined by the bismuth-Röntgen-ray test, and the normal motility of each part of the tract can be definitely determined. The food after injection begins to pass into the small intestine immediately and at least one-quarter of the gastric contents reaches the jejunum within an hour. Five hundred c.c. of milk or soup is clear of the stomach within two and a half to four hours and the final emptying time is not influenced by the existence of an increased amount of hydrochloric acid in the gastric contents. The time consumed in passing to the cecum averages two hours. It varies from one to four hours and is shorter in children. The complete emptying time of the small intestine after this meal is probably about six hours. They find that the bismuth-Röntgen-ray test is harmless and practical and can be an aid in the intelligent application of the ordinary methods of treatment. It should be employed before any operation is employed. They prefer the administration of the bismuth by the mouth over that by the rectum as giving a more natural appearance to the intestine. Milk is used as menstruum.

Hydatid Mole: Its Relation to Chorioepithelioma and Cystic Degeneration of the Ovaries. With Report of Two Cases Complicated with Eclampsia. H. N. VINEBERG, New York. *American Journal of Obstetrics*, September, 1911.

Vineberg reviews the literature, and discusses the decidual versus the ovular theory of the origin of hydatid mole. He also reports two cases of eclampsia due to hydatid mole without fetus. Very few such cases have been noted. The most important point of the author's communication is his technic for removal of the hydatid contents of the uterus. Anterior vaginal Cesarian section is recommended. By this method the cysts are rapidly removable without excessive bleeding, the uterine cavity can be freely palpated and the cysts *completely* removed. Any infiltration or tumor formation is at once recognized. Vineberg says, that when in a uterus, which has been emptied in this fashion, hemorrhage occurs within days, weeks or months, he is sure that malignant changes (chorioepithelioma) have taken place, and he is ready for a radical operation without awaiting a pathological report of curettings.

Increase and Production of Labor-Pains with Pituitrin. (*Wehenverstärkung und Wehenerregung durch Pituitrin.*) R. STERN, Breslau. *Zentralblatt für Gynakologie*, August 5, 1911.

Numerous reports have shown that subcutaneous injections of pituitary extract increase labor pains and cause post-partum contraction of the uterus. The author has used the extract to induce labor. In two cases of multipara, in the 36th and 39th week, respectively, injections of 0.6 (10 grains) inaugurated uterine contractions which lasted for several hours. The injections were repeated after a wait of 6-10 hours. In the first case labor was completed after three days, in the second after four days. The same treatment was used in a woman who suffered from tuberculosis, but had reached only the 32d week. After three days only slight dilatation had been obtained. A metreurynter likewise produced no pains, but when another dose of pituitrin was then given labor promptly set in.

In two cases of early pregnancy the drug produced labor pains, but no evacuation of the uterus. Evidently a certain irritability of the uterus must be present to permit of effective result. In six cases of Cesarian section pituitrin caused prompt expulsion of the placenta five times. Further study may show that pituitary extract will prove to be a simple and innocent means of inducing labor at term.

The Treatment of Hereditarilly Syphilitic Nurslings by Means of Injections of Salvarsan to the Nursing Mother. (*Zur Behandlung des hereditäs syphlitischen Säuglings durch Behandlung seiner stillenden Mutter mit Salvarsan.*) S. ASCHEIM, Charlottenburg. *Zentralblatt für Gynakologie*, August 5, 1911.

Several reports have been published of the successful cure of syphilis in nursing infants by salvarsan injection of the nursing mother. The therapeutic effect is supposedly due to antibodies carried over in the milk, as no trace of arsenic has been found.

Aschheim records the case of a premature syphilitic infant, whose mother received salvarsan four days post-partum. The numerous pemphigoid and popular lesions promptly disappeared, and the child was discharged cured (?) But five weeks later severe syphilitic lesions reappeared in the nursling requiring mercurial treatment. The author therefore warns against accepting favorable reports unless the patients are followed for some time, and likewise advises against this method of therapy as severe signs of lues have been noted, in at least one instance, and first appeared after the salvarsan was given to the nursing mother.

Diagnosis and Treatment of Genital Tuberculosis in the Female. (*Die Diagnose und Therapie der Genitaltuberculose des Weibes*). P. KROEMER, Greifswald. *Deutsche Medizinische Wochenschrift*, 1911, No. 23.

The most common seat of the genital tuberculous lesion is the Fallapian tube. The clinical course is not infrequently one characteristic of painful diseased adnexa and affords an occasional surprise to the surgeon operating for the ordinary inflammatory disease. Of 267 cases of female genital tuberculosis, the tubes were involved 222 times; the ovaries, 42; the corpus uteri, 67; the cervix, 11; and the vagina, 16 times. The infection seems, in general, to be a descending one. The ovaries are often found free from disease even when the adjoining tubes are extensively involved. The question of a primary tuberculous lesion in the female genital system is still unsettled except for a few authentic cases of primary cervical tuberculosis.

From the practical viewpoint it is at present immaterial whether the genital lesion is primary or secondary, whether the infection is a hematogenous one or has occurred by extension from adjoining tuberculous lesions. If the genital lesion is but a part of a generalized tuberculosis or a dif-

fuse abdominal tuberculosis surgical intervention is not indicated. When the pelvic signs and symptoms are prominent in the symptom complex, operation upon the pelvic organs is indicated, even in the presence of other undoubted fact of abdominal tuberculous disease.

Tuberculous adnexal inflammation leads to the formation of larger or smaller tumor masses, just as in gonorrheal disease. The symptoms, however, bear no relation to the size of these masses and depend chiefly upon the local adhesive or exudative peritonitis. The symptoms become most pronounced when mixed infections occur. Although miliary tuberculosis of the tubes occasionally occurs and baffles all efforts at diagnosis, the more commonly found tuberculosis of the adnexa can usually be diagnosed. In two-thirds of a large series of cases the patients suffering from genital tuberculosis had some form of tuberculosis in earlier life. Patients suffering from tuberculosis adnexa almost always complain of severe backache and abdominal pain, both increased on exertion. The dysmenorrhea from which they suffer is peculiar in persisting throughout the menstrual period. Menorrhagia is usually present; amenorrhea occurs only in the advanced cases. Sterility is not necessarily an early symptom, but it is invariably before the disease has advanced very far. Vesical disturbances—frequency, dysuria—are often present without any abnormality to be found by cystoscopic examination of the bladder. There may be alternatin constipation and diarrhea. A unilateral mass is but rarely found upon local examination. The tumors are generally bilateral and may or may not be associated with enlargement or fixation of the uterus. A tuberculous tube can no longer be considered to have a characteristic shape. The contrast between the size of the masses and the oft-times slight tenderness, as well as the contrast between the local findings and slight or absent fever, are important points. A mixed infection, of course, alters these conditions. According to Kraemer the most valuable aid in the diagnosis is an attempt at establishing an involvement of the pelvic peritoneum. By rectovaginal examination one may feel smaller or larger nodules in Douglas' sac, on the posterior surface of the uterus or on the sacro-uterine ligaments. The diagnosis of tuberculosis of the cervix, vagina and vulva is a much simpler matter.

Reference has already been made to therapy. In general, operation is not only indicated, but imperative in cases in which excision of genital foci would appear to be the removal of the chief tuberculous lesion in a woman. In isolated tuberculosis of: 1. The vulva and vagina—extirpation of the focus if technically possible. 2. The cervix or uterus—vaginal hysterectomy. 3. The tubes—bilateral salpingectomy. In generalized genital tuberculosis the radical abdominal operation, saving the ovaries only when they are clearly uninvolved. When involvement of the pelvic peritoneum has been established the abdominal operative route should always be chosen.

Professor Wertheim's Method for the Removal of Cancer Originating in the Uterine Cervix. H. T. HUTCHINS, Boston, *Boston Medical and Surgical Journal*, August 17, 1911.

Hutchins describes the technic of Wertheim's operation for uterine cancer and makes a strong plea in its favor. Quoting Wertheim's last statistics he shows that the operative mortality has been reduced from 30 per cent. in Wertheim's first one hundred cases, to 15 per cent. in his fifth one hundred, the average mortality being 18 per cent. Two hundred and fifty cases have now been followed for five years since operation; of these, 78 have had recurrence; of this number, a number have again been operated upon and can be considered cured. Of the 78 recurrences, in 62 it took place in the iliac lymph nodes. One hundred and six patients remained absolutely free from recurrences for five years. A further great advantage of the operation consists in the fact that the operability of uterine cancer cases has risen from 15 per cent. to 61.9 per cent. For the details of the operation, the reader is referred to the original paper.

Knee-joint Tuberculosis in Adults. EDWIN W. RYERSON, *Interstate Medical Journal*, August, 1911.

Starting from the point that the synovial type of the disease with little or no bone involvement has a possible chance of being cured by five years of conservative treatment; and if much bone or cartilage is involved there are three chances out of four for recovery with a knee practically stiff after five to ten years. Ryerson objects to the loss of time and earning power among the working classes by these methods. He advocates early operation that there may be speedy return to employment with the least possible injury to the knee.

Dissatisfied with the results to be secured from iodoform emulsion, iodin injections, formalin injections and the use of the Bier method, and only lukewarm about the tuberculin treatment, he is an advocate of a more or less typical excision of the knee-joint. After excision drainage is employed for thirty-six hours or longer if necessary. A cast is applied with windows for the removal of drains and for the subsequent dressings. Immobilization should be continued for six months, or better, one year. This artificial stiffening of the knee is advised for practically every case of knee-joint tuberculosis occurring in early adult life, providing there are no foci in the tibia or femur.

Olive Oil in Post-Operative Nausea. CLARENCE REGINALD HYDE, Brooklyn. *N. Y. State Journal of Medicine*, October, 1911.

The use of olive oil to lessen and even control post-operative nausea has not merited the attention of surgeons that its success warrants. For over a year Hyde has employed it after ether anesthesia is over 100 cases, with excellent results.

The technic is as follows: Just as the patient is beginning to return to consciousness (that is, roll the head from side to side, slowly open the eyes, and moan), two ounces of ordinary olive oil are administered by the mouth from a cup. The patient must be sufficiently out of the ether to understand the command to drink the oil, which is then swallowed without any difficulty. It is of interest to note that after regaining consciousness, the patient does not even recollect taking the oil. Usually within five minutes after the oil has been given there is free and copious vomiting, which in the large majority of cases, concludes the gastric disturbance. The vomited material consists of large amounts of ether-saturated mucus, free oil, and occasionally some bile. The nurse who gives the oil should be instructed to have at hand a basin and towels, and to remain by the bedside of the patient, as the vomiting which is initiated very soon after the ingestion of the oil is explosive and projectile in character. Rarely does a second vomiting attack occur, and within a short time the patient is resting comfortably, so far as the stomach is concerned, and free from nausea or retching. If the oil is not vomited, as sometimes happens, the same effect is obtained; the patient does not vomit. The absolute success of the method depends on the correct time of administration. The oil *must* be given when the patient is semi-conscious and can understand the command "to drink." If given *before this particular time*, the patient cannot swallow. If given *after* the return to the conscious state, when the patient is then nauseated or vomiting, the oil will be refused, as the sufferer is too stomach sick, and will be made more so by the sight and odor of the oil.

The Treatment of Severe Hand and Finger-Contraction the Result of Tenosynovitis. (*Zur Behandlung Schwerer Hand- und Fingerkontraktion nach Sehnenscheidenentzündung*). R. MÜHSAM, Berlin, *Zentralblatt für Chirurgie*, July 22, 1911.

In a case of severe contraction of the flexor tendons of the hand following an extensive suppuration tenosynovitis which proved resistant to other methods of treatment, Mühsam resorted to the plan adopted by Henle for ischemic contractures. This consists in a resection in continuity of 3 cm. of both radius and ulna. The result was excellent. Soon after healing of the bones the patient could close and open the fingers in a normal manner. The extensor tendons soon accommodated themselves to the shortening. One and a quarter years after the operation the use of the hand is almost perfect.

The Treatment of Chronic Nephritis in Children by the Edebohls Operation. HENRY KOPLIK, New York. *American Journal of Diseases of Children*, October, 1911.

Koplik describes the result of this operation in the cases of five children who had been chronic invalids from this otherwise incurable disease. The children had for months been subjected to all medical treatment designed to relieve the anasarca and uremia without avail. The operation was performed for the purpose of alleviating the anasarca and of affording the children an opportunity of living under more normal conditions. The operation was successful in four cases, but the fifth died as a result of the failure of the operation to cause a response on the part of the kidneys. The operations were in all cases well borne and recovery from shock was very prompt. The patients represented selected cases in which all medical measures had failed. It is inadvisable to operate in the face of acute uremic symptoms. Improvement does not set in immediately but only after the surgical wounds are healed and the kidney has become accustomed to the new circulatory conditions.

The detailed histories of the five cases form the body of the article.

Radiography of the Kidneys Inflated with Air or Gas. LEWIS GREGORY COLE. *American Journal of Dermatology and Genito-urinary Diseases*, October, 1911.

The purpose of inflating the kidneys with air or gas is to do away from the possible dangers arising from the injection of the pelvis or calices with argyrol or collargol. Injections of the pelvis increase the field of radiographic diagnosis by enabling the size and shape of the pelvis and calices to be determined, in cases of hydronephrosis, deformity, or tumor of the kidney.

While it has frequently been thought necessary to pass the catheter for injecting all the way to the kidney this is impossible to do with an obstructed or tortuous ureter. The injection of silver solutions obscures the position of a calculus in the pelvis or calices.

The advantages of inflating with air are: the catheter does not have to be inserted all the way to the kidney; air or gas surrounding a calculus accentuates its shadow; the air may be readily withdrawn after the radiograph has been made, and the sections between the calices are distinctly shown when the kidneys are inflated with air.

Where it is impossible or undesirable to insert the catheter all the way to the kidney the pelvis and calices may be inflated through the ureter by inserting the ureteral catheter only a few cm.

The air should be filtered through a wad of sterile cotton and may then be passed through a warmed alkaline solution. The catheter to be used should have an end that may be expanded so as to fill the lumen of the ureter.

A radiograph should be made before the inflation is begun. After the inflation the radiograph should be made as usual save that compression should be avoided as much as possible.

The danger from air embolism is negligible.

The Diagnosis of Kidney and Ureteral Calculi. DANIEL N. EISENDRATH. *The Albany Medical Annals*, October, 1911.

In considering the means of diagnosis at present available no pathognominic symptom is to be found. The clinical history and examinations of the urine with the study of the radiographs of the kidney region are always necessary. After a consideration in brief of the various symptoms the point of the paper settles upon a discussion of the value of radiographs. A positive skiagraph taken by an experienced worker in this field presents the only absolute test of the presence of a renal or ureteral calculus. To be perfect a skiagraph must show the last two ribs, the transverse processes of the last dorsal and all of the lumbar vertebrae and the outline of the psoas muscle.

With proper technic Eisendrath believes that shadows of calculi may be obtained ninety-nine out of every hundred cases if stones are present.

Sapheno-Femoral Anastomosis—Implantation of the Saphenous Into the Femoral Vein as an Operative Treatment of Varicose Veins. (*Die Sapheno-Femoral Anastomoses, Eine Ueberpflanzung des Vena Saphena in die Vena Femoralis Mittelst Gefaessnaht als Operative Behandlungsmethode bei Varicen*). E. HESSE and W. SCHAAK, St. Petersburg. *Archiv für Klinische Chirurgie*, Vol. 92, Part 2.

A wholly satisfactory operation for varicose veins of the lower extremities has not yet been devised. The high ligation of the saphenous vein, the partial or total extirpation of the saphenous system, the spiral incision and other methods have drawbacks. No matter what the etiological factors at work the stasis of blood in the saphenous system, in cases of varicose veins, depends upon insufficiency of the valves in the saphenous (and femoral) veins. Trendelenburg's symptom or sign is based upon this venous insufficiency.

In order to overcome the valvular insufficiency Delbet, in 1906, devised the operation of sapheno-femoral anastomosis. Through an incision in Scarpa's triangle he freed and isolated the saphenous vein. He then mobilized the femoral vein and selected a point about four inches below the saphenous insertion for implantation. The saphenous vein was then divided, clamps were applied to the femoral vein above and below the point chosen for anastomosis, and an incision was made into the vein. An end-to-side anastomosis was then made by means of continuous sutures. Delbet reported eight cases operated upon after this method, all with good results.

Before the authors attempted Delbet's operation they made some studies upon the question of valves in the saphenous and femoral veins. From a large series of cases they concluded that: 1. There is usually one pair of valves in the femoral vein above the insertion of the internal saphenous vein. 2. Valves are always to be found in the femoral veins below the saphenous insertion. They are generally two to three in number, and are usually spaced at distances of 1 to 1½ inches. 3. There are usually several pairs of valves in the upper part of the saphenous vein. 4. The incision should therefore be placed at least four inches below the saphenous insertion. 5. The operation is correctly conceived, from the anatomical viewpoint.

Hesse and Schaack have performed the operation in 23 cases. The patients presented very varied grades of varicosities, in 15 cases the varicosed veins were exceedingly large. No cases were operated upon unless they presented Trendelenburg's sign. Sixteen of the patients had leg ulcers for very varying periods of time. One patient died from an infective (streptococcus) infection at the site of the anastomosis. In every one of the remaining 22 cases insufficiency of the veins as tested by Trendelenburg disappeared after operation. In all the cases the varicosed veins disappeared and the ulcers of the leg healed in every instance (in six of the cases within twenty days, in the remaining seven cases, within thirty days).

The authors believe the operation is contraindicated: 1. In sick or weak individuals. 2. When the varicosities do not depend upon valvular insufficiency. 3. In inflammation or thrombosis of the saphenous vein. 4. When the varicosities are not in the distribution of the main saphenous system. 5. When an infection via the lymphatics seems likely—badly infected ulcers, oft-repeated erysipelas, etc. 6. In marked sclerosis of the saphenous or femoral veins. 7. When the saphenous or femoral veins are of very small caliber.

The Treatment of Gonorrheal Arthritis with Tincture of Iodine Injections. (*Die Behandlung der gonorrhoischen Gelenkentzündung mit Injektion von Jodtinktur*). O. HILDEBRAND, Berlin, *Berliner klinische Wochenschrift*, July 31, 1911.

For three-quarters of a year, Hildebrand has treated gonorrhea joints by the injection of 5 c.s. of tincture of iodine. The results were brilliant. Soon after the injection there ensued a marked swelling of the joint which, however, soon subsides; in a few days the pain disappears, motion returns and the swelling does not recur. Hildebrand is satisfied that the iodine does not bring about adhesions. Poisoning cannot occur.